THE GENUS DALDINIA

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The separation of the genus *Daldinia* from *Hypoxylon* has been a long and gradual process, one that even to-day appears to be of doubtful value to some mycologists. It is true that some species of *Hypoxylon* show some evidence of zonation in the entostroma, and it is these species that have caused part of the difficulty in determining generic limitations, since, for the most part, no other characters than zonation of the entostroma have been found. However, the genus *Daldinia*, as understood by the writer, seems to be worthy of retention, and in fact should be retained in order to segregate a characteristic group of species from the already large and cumbersome genus *Hypoxylon*. Since many species have been described in the genus *Daldinia* which have been accepted in part only, the writer feels that a monographic study of the genus, based on the careful examination of a large number of specimens, is highly desirable.

HISTORY

The history of the genus *Daldinia* has been similar to that of most of the larger and early recognized fungi,—very varied and with many ups and downs. As originally described by Scopoli,[1] the species now known as *Daldinia concentrica*, the type of the genus, was placed in *Valsa* as *V. tubersoa*. Following this early investigator was Hudson[2] who placed the species in the genus *Lycoperdon*, using the specific name *fraxineum*. A year later, Bolton[3] applied the name of *Sphaeria concentrica*. Schaeffer,[4] in the explanation of the plate in his 'Icones,' called the species *Lycoperdon atrum*, but later in the same work[5] gave the species the name of *Sphaeria concentrica*. The classification of Bolton

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[1] Scopoli, J. A. Flora Carniolica, ed. 2, 2: 399. 1722.

[2] Hudson, W. Flora Anglica 2: 641. London, 1778.

[3] Bolton, J. Hist. Fung. Halifax 3: 180. *pl. 180* of appendix. 1789.

[4] Schaeffer, J. C. Icon. Fung. Bav. et Pal. 4: 131. *pl. 329*. 1800.

[5] *Ibid.* 129. *pl. 329*. 1800.

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was accepted by Fries[6] and others, undoubtedly because there was no such confusion of nomenclature as existed in the work of Schaeffer. An examination of the synonymy of *Daldinia concentrica*, as given later in this paper, will give ample evidence of the confusion that existed in the relation to the type, which was at that time the only species of *Daldinia*, hence little more need be said about the early conception of the species.

Prior to Persoon[7] the genus *Sphaeria* was a more or less heterogeneous group of species. In 1801 he divided the genus and placed *Sphaeria concentrica* Bolt. in his new section *Periphericae* as species 11. Apparently this section was not recognized by Fries (*l.c.*), since in 1823 he placed the species in the tribe III, *Pulvinatae*, along with members of the subgenus *Hypoxylon*. At the same time he recognized two varieties of *Sphaeria* (*Hypoxylon*) *concentrica:* (b) *S. Eschscholzii* and (c) *S. obovata*. Later in 1849, Fries[8] revived Bulliard's genus *Hypoxylon* and divided that genus into three groups for which he proposed the names *Glebosae*, *Pulvinatae* and *Effusae*. *Hypoxylon concentricum* was placed in *Pulvinatae*. Meanwhile Léveillé[9] had created the tribe *Concentricae* in the genus *Sphaeria* to include, among others, his new species, *S. loculata* and *S. cingulata*, that were later assigned to *Daldinia*. In this division of *Sphaeria*, he was apparently supported by few mycologists of his time.

Daldinia, as it is understood to-day, was erected in 1863 by Cesati and DeNotaris,[10] who observed that the concentric zonation of the stroma was more pronounced in *Daldinia concentrica* than in other species of *Hypoxylon* with which the species had been formerly associated. The acceptance of the genus was not immediate, and, in fact, met with some opposition. Nitzschke,[11] in writing of *D. concentrica*, says "Die Trennung der vorliegenden und der ihr nächstverwandten, ausserdeutschen Arten von

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[6] Fries, E. Systema Mycologicum **2:** 331. 1823.

[7] Persoon, C. H. Snyopsis methodica fungorum **1:** 8. *pl. 1, figs. 3–4.* Göttingen, 1801.

[8] Fries, E. Summa Veg. Scand., 383–384. 1849.

[9] Léveillé, J. H. Ann. Sci. Nat. Bot. III. **3:** 46–47. 1845.

[10] Cesati, V. & De Notaris, E. G. Schema Classif. d. Sferiacei **4:** 197–198. Gennaio, 1863.

[11] Nitzschke, T. Pyrenomycetes Germanici. 25–26. Breslau, 1867.

Hypoxylon und die Auffassung der Gruppe als besondere Gattung (*Daldinia Ces. et De Not.*), halte ich für nicht gerechtfertigt." This train of thought was also followed by Fuckel,[12] who recognized the species only as an *Hypoxylon* and admitted the existence of but one variety, namely *Hypoxylon concentricum* var. *obovatum*.

With the acceptance of *Daldinia* by Saccardo,[13] the objection to the genus appears to have lessened, although Cooke,[14] who made a study of *Xylaria* and *Hypoxylon*, wrote: "We should have preferred to have followed Nitzschke, and merged *Daldinia* (*Hypoxylon concentricum*) and *Bolinia* (*Hypoxylon tubulina*) in *Hypoxylon*. A comparison of the above characters will show that the only difference in *Daldinia* is the concentric stroma, although several of the globose *Hypoxyla* exhibit faint concentric zones when in good condition. The difference in *Bolinia* is that the perithecia are immersed, with rather long necks. These are very slight generic differences indeed as compared with some which might have been isolated, such as the very singular *Hypoxylon lycogaloides* B. & Br., and the equally strange and anomalous *H. solidum*, Schwz. If any species deserved to be raised to generic rank it was these." Saccardo's acceptance of the genus, then, marked the turning point, and from that date, separated on the conspicuously zonate character of the stroma, it has been accepted generally, even though a number of bridging species, such as *Hypoxylon Petersii*, *H. exsurgens*, *H. placentiforme*, and others, are known to exist.

Discussion of Diagnostic Characters

It has been observed by Theissen[15] that certain characters of the ascocarp vary or disappear with age, and thus alter one's conception of the species and lead to a certain amount of confusion in classification. He claims that the nature of the ostioles and the color of the ectostroma are functions of age and are not suitable for specific differentiation. This is in part true, but when such characters are correlated with others they may be very significant. Still, the changes that occur with advancing maturity or subsequent weathering must be regarded in order to make a correct determination, since some closely related species are so similar in their youth that accurate determination cannot be made unless the investigator is familiar with all members of the genus.

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[12] Fuckel, L. Symbolae Mycologicae, Suppl. 2, p. 43. 1873.

[13] Saccardo, P. A. Sylloge Fungorum **1**: 393. 1882.

[14] Cooke, M. C. Grevillea **11**: 121–140. 1883.

[15] Theissen, F. Ann. Myc. **7**: 3–5. 1909.

The nature of the ectostroma may be used to a certain extent for the rough delimitation of certain species or groups of species. Thus the degree of laccateness, as in the case of *D. vernicosa*, which is laccate and shining, is somewhat specific. This is especially true when the species are studied in the field during their prime. If they are laccate they feel smooth, slippery, and somewhat moist, especially in moist or rainy weather when a somewhat viscous liquid abundant in the stroma appears to be exuded on the surface of the fruiting body. This character, however, should be used with caution, since species that are not laccate may be shiny black or bronze-black, but they, as a rule, become dull on weathering. Laccateness may be defined as a condition of the ectostroma which, as a result of the hardening of a viscous exudation, becomes varnished, has a brilliant sheen, and therefore simulates the appearance of a wet surface. Before the ascocarps reach maturity, the laccate nature of the surface may be obscured by the presence of a brownish or grayish lavender "bloom" of conidia.

The consistency of the ectostroma, while variable and somewhat difficult to define, may be fairly constant within a species. In some species it is very thin and brittle and weathers away soon after the fruiting body has reached maturity and has discharged its ascospores (pl. 29, fig. 1a); in others it is somewhat thicker and, while more resistant to weathering, is nevertheless easily punctured by the finger-nail; and yet others have a very durable outer layer.

Wrinkling of the surface of the fruiting bodies is at best an uncertain character and of little value if considered on its own merits. This is especially true in connection with such a species as *D. vernicosa*, of which the ascocarps when mature are filled with an abundance of a viscous liquid that disappears on drying and allows the inner tissue to collapse or to become loculate, with the accompanying wrinkling of the outer surface. The proportion of liquid to tissue varies not only with the age of the fruiting body but also with the weather, since during seasons of continuous rain growth is more rapid, the liquid is more abundant, and the hyphal elements appear to deliquesce more rapidly. Similarly, folding, lobing, and other gross characters appear to be influenced greatly by the nature of the substratum and by environmental conditions. Thus when growing on such porous wood as that of *Betula*, *D. concentrica* attains a larger size than it does when inhabiting a more dense substratum. As will be noted later in the discussion under *D. vernicosa*, the nature of the substratum and the environmental conditions may be an explanation of the huge fruiting bodies of the species described as *D. fissa* by Lloyd.[16] In brief, then, external characters should not be used too freely because of the pronounced effects of environmental conditions.

By means of the entostroma, the species of *Daldinia* may be divided into two easily recognized groups:—one characterized by having a dense fibrous context which is usually brown or shades of brown or brownish-gray and marked with relatively thick, darker brown, concentric zones; the other by having collapsing, white or grayish, loculate zones alternating with relatively thin darker zones. The loculate character of the stroma of the latter group appears to be the result of the loss of the abundant viscous fluid which may have been formed by the gelatinization of a portion of the hyphal elements. The darker zones, according to Miller,[17] are formed by the disintegration of perithecial initials, followed by continued growth beyond the perithecial initials to produce successive zones, the number of zones being limited by the time of formation of the perithecia. Zonation and the color and nature of the entostroma are sometimes very valuable as specific characters.

The amount of protrusion of the ostioles, while somewhat variable in some species, appears to be a valid and easily recognizable character in others. For example, *D. cuprea* and *D. clavata* are readily separated on this character alone (pl. 30, figs. 6, 7). Fortunately, there are other characters that are correlated with this. In *D. concentrica* this character, while varying within a rather narrow range, may also be used to some extent; however, it should not be relied upon too greatly, since, when the surface is made minutely papillate by the protrusion of the ostioles, the fruiting body has a somewhat different aspect. These same words also apply to *D. Eschscholzii*, in which, as shown in pl. 29, fig. 5, the ostioles are merely punctate, whereas in other specimens (pl. 29, figs. 3, 6) they may be minutely papillate. The amount of protrusion of the ostioles, in some instances, appears to be dependent on the amount of humidity. As is shown in pl. 28, figs. 7, 8, the ostioles on the upper surface of the ascocarp are represented by papillate protrusions, while those on the lower surface of the same fruiting body, closer to the surface of the substratum, are not only papillate but *Rosellinia*-like. With such variations and exceptions in mind, the degree of prominence and the distance between the ostioles may prove a distinct aid in recognizing the species.

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[16] Lloyd, G. C. Myc. Notes **7**: 1313. *pl. 306, fig. 2986.* 1929.

[17] Miller, J. H. Mycologia **20**: 328. 1928.

The size and shape of the perithecia may be somewhat variable, partly because of environmental influences, but when correlated with other characters they are sufficiently constant to be of diagnostic value (pls. 31–33). In the majority of species the perithecia are arranged in a single row around the periphery of the stroma, that is, the perithecia are monostichous; but in a few, the perithecia are polystichous and arranged either evenly or unevenly in two rows. It is possible that the polystichous arrangement may be due to the crowding of the perithecia which forced them to take positions at unequal levels; or it may be a temporary condition that has resulted from the sudden checking of growth. In any case, the polystichous arrangement often varies and may exist in one part of an ascocarp whereas in another the perithecia may be monostichous.

It is important when studying the perithecia, to cut the sections in a plane that passes longitudinally through the perithecia as close to the ostiole as possible. By this procedure errors in observing the size and shape of the perithecia will be minimized. Also, in order to determine the true nature of the ostioles, this precaution should be observed. Miller[18] makes the statement:

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[18] Miller, J. H. *l. c.* 329.

"The perithecial necks do not penetrate through the ectostroma, so the ostiola are umbilicate." The writer, after a study of many sections, has come to the conclusion that all of the necks of mature perithecia do penetrate the ectostroma and at least reach the surface of the fruiting body, as is shown in pl. 31, fig. 1, pl. 32, figs. 1, 2, 4, pl. 33, figs. 1, 3, 5.

The ascospores of members of this genus are predominantly purple-black in mass, but when mounted and observed under the microscope they vary, according to the species, from amber color to brown or brownish-black. As is characteristic of most members of the Xylariaceae, the spores are provided with a longitudinal cleft through which the germ-tube subsequently grows. In certain species, such as *D. cuprea* and *D. albozonata*, the amber-colored spores have a dark brown mesospore, whereas the dark spores have an amber-colored one. The exospore is hyaline and takes the blue stain of the lactophenol-cotton-blue mounting medium. This outer layer sloughs off during the process of spore germination.

While there is no great variety of shapes among the ascospores of the different species, such differences as do exist vary but little within a single species and so may be used as taxonomic characters. Usually the spores are ellipsoid and symmetrical, but they may also be inequilaterally ellipsoid with either acutely or bluntly rounded ends (pls. 26 and 27). Again, these ends may be hyaline and refractive, but the character does not appear to be one on which too great reliance should be placed.

There is no specifically characteristic method of ascospore discharge, for in all species with which the writer is familiar in the field, the spores are ejected in long threads that soon break up. Theissen[19] has also made this observation, and Rick[20] described *D. barbata* as a new species because of the fact that the ascospores were extruded in such a manner.

[19] Theissen, F. *l. c.* 3.

[20] Rick, J. Broteria **5**: 50. 1906.

Geographical Distribution

In a previous paper, the writer[21] has had occasion to remark on some of the factors that appear to be of importance in limiting the number and distribution of certain species. It is realized that by no means have all factors been considered, nor is it possible in this paper to add any further information that is based on experimental data.

Of the thirteen species recognized in this paper, but four have a relatively limited distribution, that is, they are confined to one continent or a portion thereof. Thus *Daldinia simulans*, as will be seen from an examination of the accompanying maps, is confined to the United States and is apparently not found outside of the Mississippi Valley where it has been found only in Ohio, Illinois, and Missouri. *D. clavata*, apparently a rare species, has been collected in North and South America, ranging from Mexico to Argentina. There are no doubts as to the distribution of *D. albozonata*, for this species has only been collected in Africa, being found in French Equatorial Africa (formerly Kamerun), Angola, and in Uganda. There is the possibility that the range of the species is coextensive with that of the West African rain forest. The only representative of the genus that is confined to Europe is *D. caldariorum* which is known only from the original collection that was made in a fern house in the Botanical Garden at Berlin. What significance this species might have is difficult to determine, for it cannot be said, without fear of contradiction, that the species is endemic to Europe. From the very nature of the place in which it was collected there is the possibility that the spores may have been introduced from almost any country. It has in fact been reported from Brazil.

Daldinia concentrica and *D. vernicosa* both have a very wide range of distribution, but with a few exceptions the two species appear to be confined to the regions outside of areas included between the 70° F. isotherm lines, or north of 30° north latitude. Within the boundaries of North America as thus delimited, it is obvious that the distribution has some particular climatic and humidity relation, since the species studied were collected either in river valleys or near large bodies of water, regions in which

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[21] Child, M. Ann. Mo. Bot. Gard. **16**: 411–486. 1929.

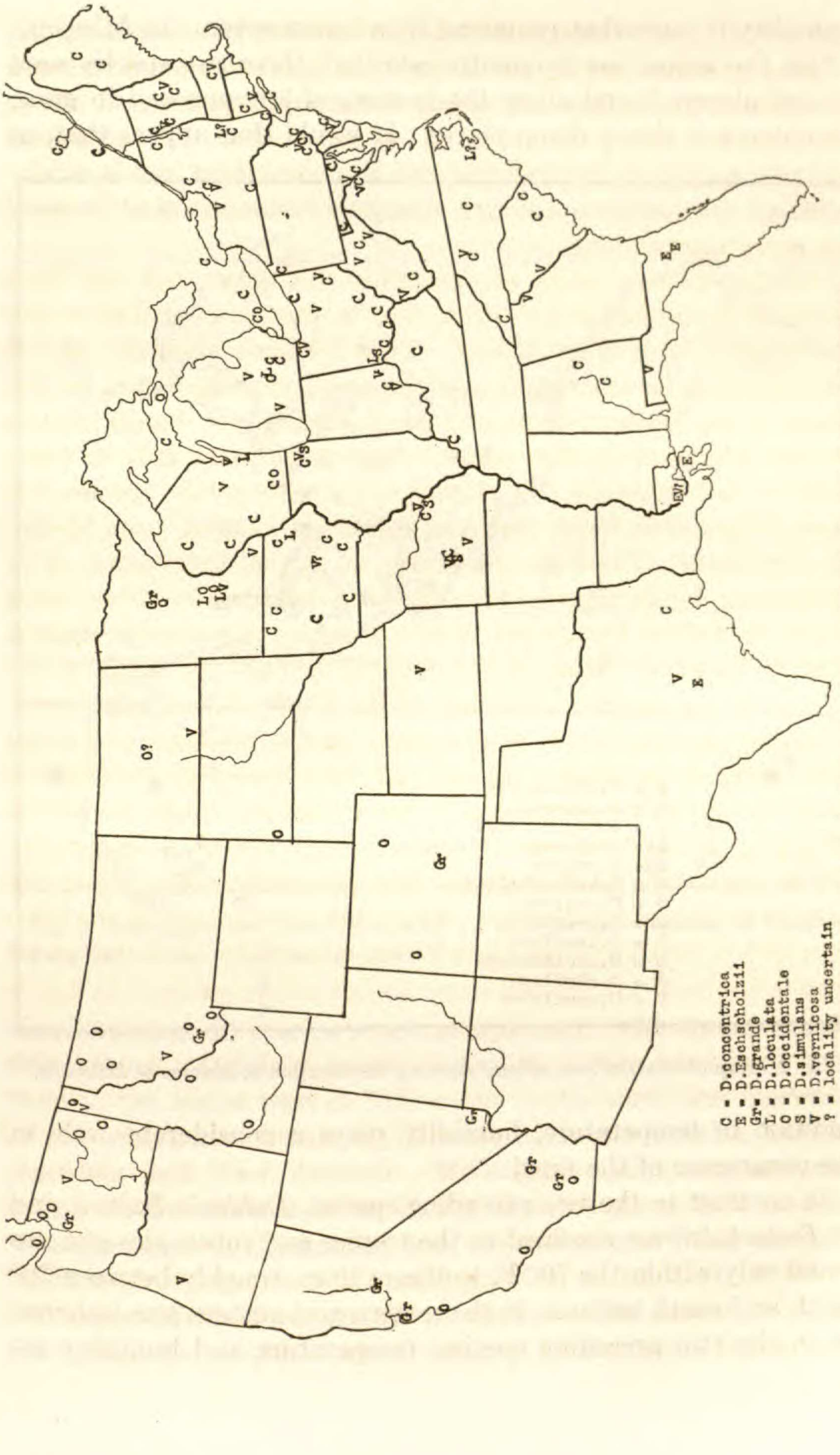

Fig. 1. Map of United States showing distribution of species of *Daldinia.*

humidity is somewhat protected by a forest cover. In Missouri, where the writer has frequently collected, these two species were almost always found along the borders of streams and in great abundance in shady damp places. It would thus appear that, in addition to temperature, humidity plays a considerable role in the occurrence of the fungi.

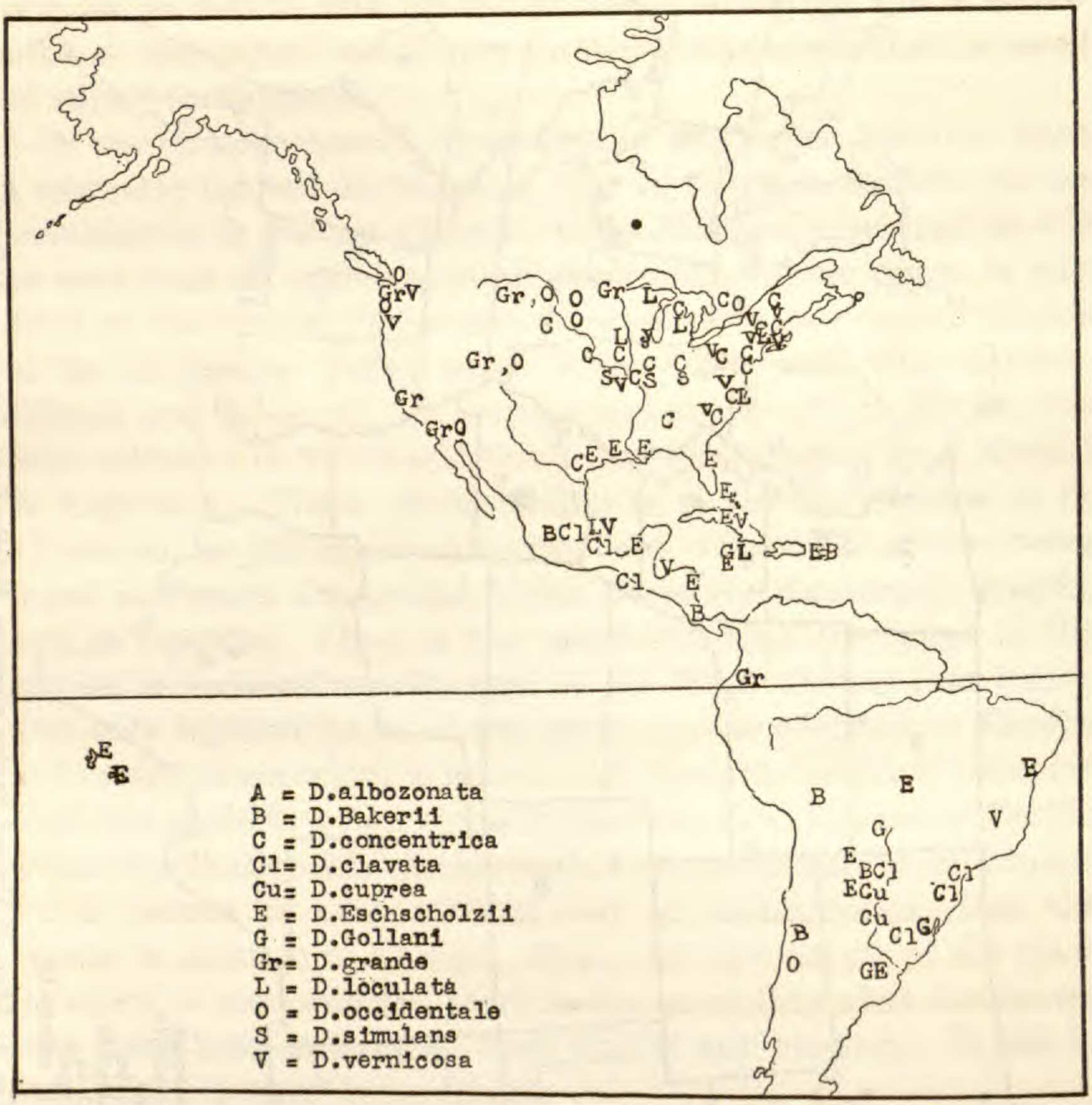

Fig. 2. Map of western hemisphere showing distribution of species of *Daldinia.*

In contrast to the two preceding species, *Daldinia Bakerii* and *D. Eschscholzii* are confined to the tropics and subtropics and are found only within the 70° F. isotherm lines, roughly between 30° north and south latitude, in the eastern and western hemispheres. As in the two preceding species, temperature and humidity relations apparently are limiting factors in determining the occurrence of these two fungi, although a higher temperature appears to be of greater importance when the factor of humidity is favorable.

The above explanation of the distribution of the representatives of the genus would be simple were it not for the fact that the distribution of all species is not in agreement with such a simple explanation. *Daldinia grande*, which in North America is confined to the states west of Minnesota in the north and Colorado in the south, also occurs in Ecuador in South America, and in Australia and New Zealand. With such contrasting seasonal ranges as are represented in North America alone, it is evident that the range of the species does not coincide with any definite isothermal zone, yet if it were possible to have an intimate knowledge of the localities in which the collections were made there might possibly be some modifying circumstances that would

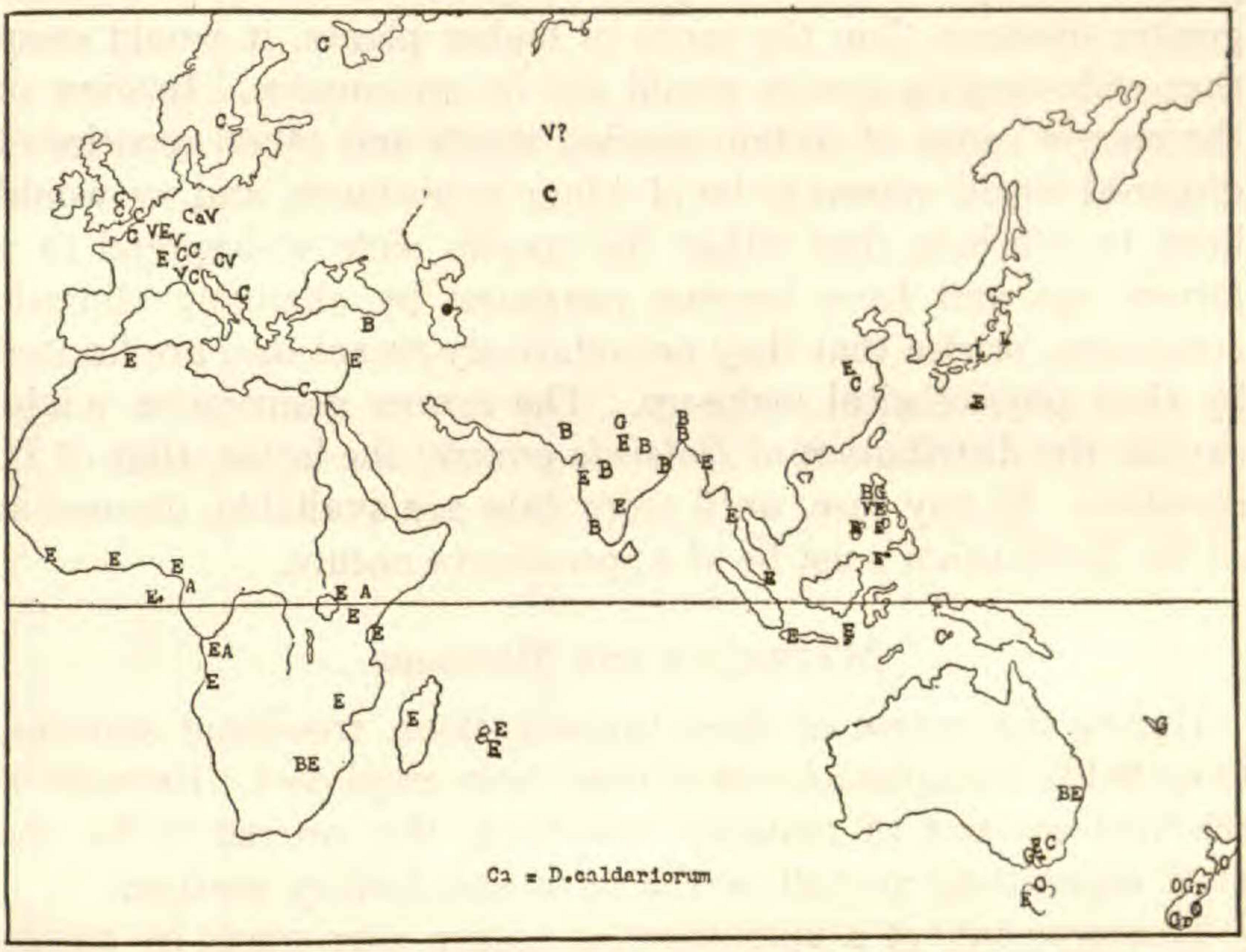

Fig. 3. Map of eastern hemisphere showing distribution of species of *Daldinia*. For explanation of symbols see figs. 1 and 2.

prove the distribution to be in general agreement with the theory suggested above.

In the present state of our knowledge, it is very difficult to find much rhyme or reason for the distribution of fungi, partially, it is true, because of the relatively few collections that have been made as compared with the number of collections of phanerogams. Furthermore, since spores may be carried over a much greater distance than the seeds of higher plants, it would seem that wide-ranging species would not be uncommon. In view of the narrow range of certain species, winds and other agencies of dispersal would appear to be of minor importance, and we would have to conclude that either the species were widespread in a former age and have become restricted by changing climatic conditions, or else that they are relatively recent and are limited by their physiological make-up. The former assumption might explain the distribution of *Daldinia grande;* the latter, that of *D. simulans.* In any case, until more data are available, discussion of the distribution must be of a speculative nature.

MATERIALS AND METHODS

During the course of these investigations, free-hand sections, mounted in lactophenol-cotton blue, were employed. Because of the vast amount of material examined, this proved to be the most expeditious as well as the most satisfactory method.

Measurements of a microscopical nature were made by means of a calibrated eye-piece micrometer. It was at first thought that, in order to obtain a fair representation of the range in spore size, a large number of measurements was necessary, and accordingly one hundred spores from each ascocarp were measured. However, after comparing the count of one hundred spores with that of twenty-five, it was found that the results when plotted graphically were practically identical, and it was therefore considered unnecessary to measure more than twenty-five spores per ascocarp, especially when that number from each of several ascocarps of the same collection were measured. The results showed that there was very little variation since the spores fell within the same size-class or size-classes. Within limits, the same statement may be made in regard to the measurements of ascospores of

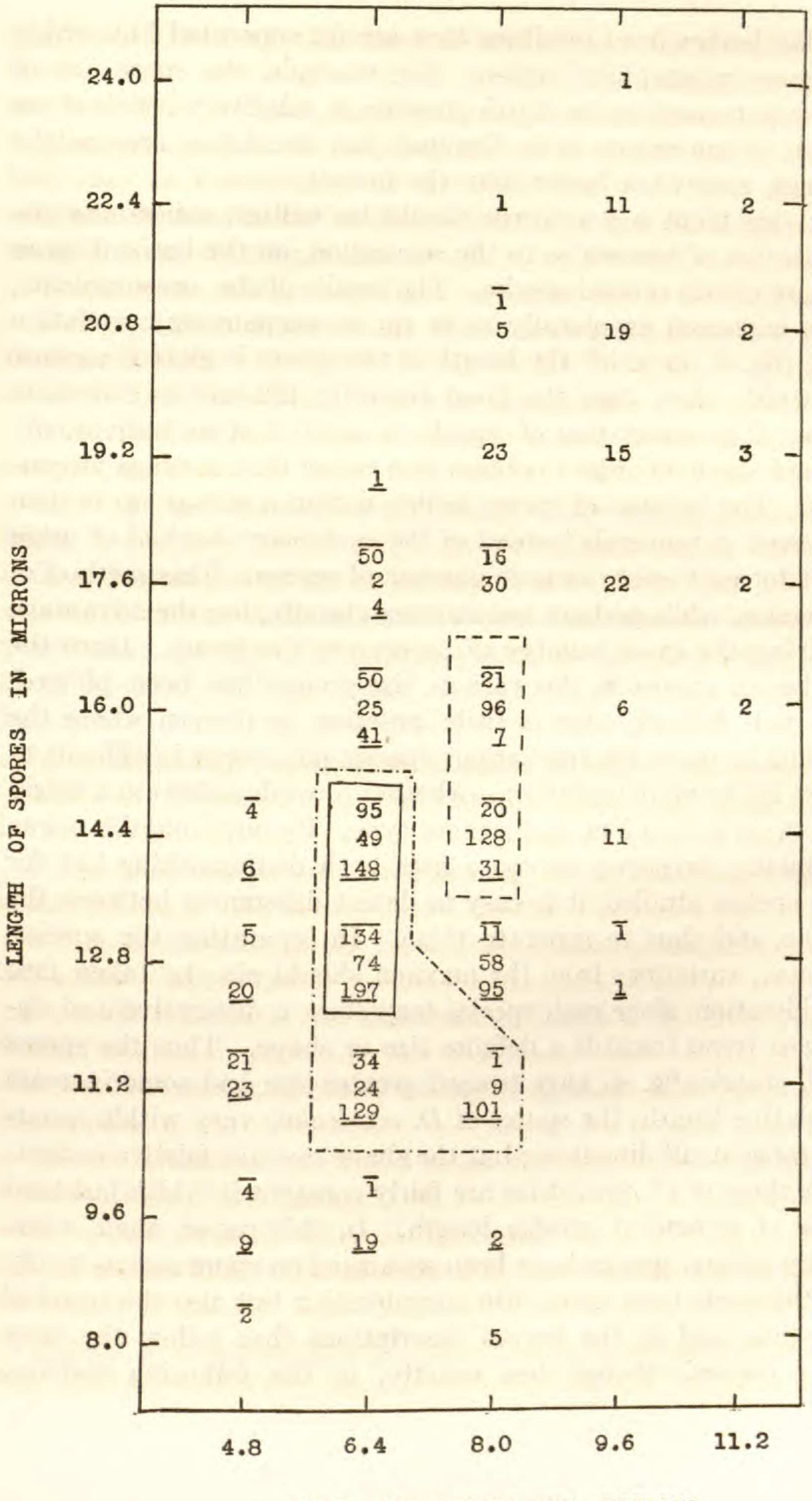

Fig. 4. Correlation table expressing application of biometrics to separation of closely related species. *D. concentrica* = $\overline{0}$ = —·—·—; *D. grande* = 0 = - - - - - -; *D. occidentale* = $\underline{0}$ = ————.

fruiting bodies from localities that are far separated but within the same geographical region. For example, the spore size of *Daldinia concentrica* in North America is relatively constant, as is that of specimens from England, but the latter are, on the average, somewhat larger than the former.

At this point a few words should be written concerning the application of biometrics to the separation, on the basis of spore sizes, of closely related species. The results of the measurements, when expressed graphically as in the accompanying correlation table (fig. 4), in which the length of the spores is plotted against the width, show that the great majority fall within a definite range. The correlation of length to width is done individually for each spore, in order to obtain true rather than average proportions. The number of spores falling within a size-group is then expressed in numerals instead of the customary method of using a dot for each spore or unit number of spores. This method of expression, while perhaps less striking visually, has the advantage of giving the exact number of spores per size-group. Once the number of spores in the various size-groups has been plotted, it is not difficult, after a little practice, to discern where the maxima or mode for the various species fall, nor is it difficult to detect the trend of variation,—whether towards a short and broad type of spore or a long and slender type. By outlining the points of greatest frequency of spore sizes by a distinguishing line for each species studied, it is easy to detect differences between the species and thus to separate them. In separating the species, however, variations from the maxima should also be taken into consideration, since each species may show a distinctive and significant trend towards a definite size or shape. Thus the spores of *D. grande* (fig. 4) vary toward greater size and some increase in relative length; the spores of *D. occidentale* vary within a narrow range in all directions, but the shape remains fairly constant; while those of *D. concentrica* are fairly constant in width but tend to be of somewhat greater length. In this paper, then, when closely related species have been separated on spore size, not only has the mode been taken into consideration but also the trend of variation, and in the formal descriptions that follow the facts are expressed, though less exactly, in the following fashion:

"spores (8)–14.4–16–(27.2) x (6.4)–8–(11.2) μ." In this formula, the numerals within parentheses represent the extremes of spore size, and those without, the average or most frequent sizes.

Measurements of the ascocarps are given in three sets of numbers, as, for example, 2.5–3 x 2–3 x 1–2.5 cm. The first set refers to the length, the second to the width, and the third to the height of the fruiting bodies.

Colors when within quotation marks are those of Ridgway.[22]

In the citation of specimens, the following abbreviations have been employed:

A = Museo de la Plata, La Plata, Argentina.

B = Herbarium of the Botanical Museum, Berlin-Dahlem, Germany.

F = Farlow Herbarium, Harvard University, Cambridge, Mass.

Ia = Herbarium of the University of Iowa, Iowa City, Ia.

L = Herbarium of the late C. G. Lloyd, Smithsonian Institution, Washington, D. C. The numbers cited in this paper are those given by the U. S. Department of Agriculture to replace those of Lloyd.

Li = Herbarium of David H. Linder, Harvard University.

MBG = Herbarium of the Missouri Botanical Garden, St. Louis, Mo.

NC = Herbarium of University of North Carolina, Chapel Hill, N. C.

NY = Herbarium of the New York Botanical Garden, Bronx Park, New York City.

P = Herbarium of the Museum of Natural History, Paris, France.

Pa = Herbarium of the Academy of Natural Sciences, Philadelphia, Pa.

PDS = Herbarium of Plant Disease Survey, U. S. Department of Agriculture, Washington, D. C.

Po = Herbarium of Alfred H. W. Povah.

S = Herbarium of C. L. Shear, U. S. Department of Agriculture.

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[22] Ridgway, R. Color standards and color nomenclature. Washington, D. C., 1912.

Sh = Herbarium of Paul Shope, Boulder, Colorado.
St = Herbarium of the State Museum, Stockholm, Sweden.
T = Herbarium of the University of Texas.
W = Herbarium of Leva B. Walker, Lincoln, Nebraska.

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TAXONOMY

DALDINIA

Stromata superficial, hemispherical, subglobose, globose, turbinate, or clavate, sessile, substipitate or stipitate. Ectostroma carbonaceous, at first pruinose, later dull black, shining, or laccate. Entostroma dense or lacunate, white, gray, or brown, *conspicuously concentrically zonate.* Perithecia claviform to subglobose, immersed in the stroma, not umbilicate with obsolete to protruding or papillate ostioles. Asci cylindrical, soon disappearing, 8-spored, the spores obliquely uniseriate. Ascospores simple, ellipsoid to navicular, light to dark brown, translucent or opaque.

The genus as here understood is separated from *Hypoxylon* by its conspicuously zonate stroma. In some species of *Hypoxylon,* however, there may be slight indications of zonation, but these have been excluded from the genus. Usually the ascocarp of *Hypoxylon* varies from resupinate to sessile; rarely are they substipitate, and never stipitate. Also, while tropical forms of *Hypoxylon* may attain enormous sizes and simulate *Daldinia* externally, the ectostroma is usually very much roughened, very thick, and the entostroma very dense and homogeneous or woody.

KEY TO THE SPECIES OF DALDINIA

1. Inner context dark brown or brownish, persistent, dense. (See also *D. Bakerii*) 2
1. Inner context light, lighter zones white or some shade of gray, dense or collapsing, with persistent dark zonal lines 6

2. Ascocarp sessile or substipitate, stipe when present broad, exceeding 5 mm. in thickness and not cylindrical..3
2. Ascocarp definitely stipitate, the stipe cylindrical, less than 5 mm. thick and supporting a globose to subglobose fertile head..........*8. D. loculata*
3. Ostioles obsolete to punctiform; ascocarp smooth or very slightly papillate; spores (8)–11.2–(14.4) x 4.8–(6.4) μ......................*4. D. Eschscholzii*
3. Ostioles prominent, papillate to mammiform; ascocarp somewhat rough to rough..4
4. Ascospores (8)–14.4–16–(27.2) x 6.4–8.–(11.2) μ; ascocarps usually large, irregular, always sessile; perithecia mostly polystichous........*3. D. grande*
4. Ascospores smaller; ascocarps not as above................................5
5. Mature ascocarps bronze-black; spores bluntly rounded, (9.6)–12.8–(19.2) x (4.8)–6.4–8–(9.6) μ................................*2. D. occidentale*
5. Mature ascocarps vinaceous-black to dull black; spores rounded, tapering at either end, (8)–12.8–14.4–(20.8) x (4.8)–6.4–(8) μ......*1. D. concentrica*
6. Inner context dense, not collapsing................................7
6. Inner context loose, collapsing................................9
7. Ostioles prominent; ascospores (9.6)–14.4–(24) x (4.8)–6.4–(11.2) μ. .*5. D. Bakerii*
7. Ostioles obsolete to punctiform................................8
8. Perithecia subspherical; ascospores (6.4)–9.6–(12.8) x (3.2)–4.8–(6.4) μ. ....*6. D. Gollani*
8. Perithecia elongate-ovoid; ascospores (9.6)–11.2–(14.4) x 4.8–(6.4) μ....... ....*7. D. caldariorum*
9. Ascocarps turbinate or irregularly turbinate................................10
9. Ascocarps clavate................................12
10. Spores small, (6.4)–8–(9.6) x (2.4)–3.2–(4.8) μ................*11. D. albozonata*
10. Spores larger................................11
11. Ascocarp vinaceous, laccate at maturity; stipe inconspicuously zonate; spores (8)–11.2–12.8–(17.4) x (4.8)–6.4–(8) μ................*9. D. vernicosa*
11. Ascocarp drab or drab-brown; stipe zonate; spores (9.6)–11.2–(14.4) x (4.8)–6.4–(8) μ................................*10. D. simulans*
12. Perithecia confined to the upper part of the stipe-like stroma, with conspicuous ostioles; stipe externally zonate with annulate thickening...*12. D. cuprea*
12. Perithecia over entire stroma, not confined to upper half; ostioles obsolete to punctiform................................*13. D. clavata*

1. Daldinia concentrica (Bolt.) Cesati & DeNotaris, Schema Classif. d. Sferiacei **4**: 197. 1863.

Fungus fraxineum etc. Raius, Hist. Pl. **1**: 109. 1686; Syn. Stirp. Brit. ed. 3. 16. No. 20. 1724.

Valsa tuberosa Scopoli, Fl. Carniolica, ed. 2. **2**: 399. 1722.

Lycoperdon fraxineum Hudson, Fl. Angl. **2**: 641. 1778.

Sphaeria concentrica Bolton, Hist. Fung. Halifax **3**: 180. *pl. 180* of appendix. 1789.

Sphaeria tunicata Tode, Fung. Meckl. Sel. **2**: 59. *pl. 17, fig. 130 a–g.* 1791.

Lycoperdon atrum Schaeffer, Icon. Fung. Bav. et Pal. **4**: 131. *pl. 329.* 1800 (as *Sphaeria concentrica* p. 129).

Sphaeria fraxinea Withering, Arrang. Brit. Pl. ed. 5. **4**: 429. 1812.

Sphaeria hemisphaericae Nees, Syst. d. Pilze **1**: 291. 1817.

Sphaeria concentrica Bolton ex Fries, Syst. Myc. **2**: 331. 1823.

Stromatosphaeria concentrica Greville, Fl. Edinensis, 355. 1824.

Sphaeria (*Pulvinata*) *placenta* Link, Linnaea **5**: 539–540. 1830.

Hemisphaeria concentrica Klotzsch, Acad. Caes. Leop. Nova Acta **19**: 241. 1843.

Pl. 27, fig. 4; pl. 28, fig. 4; pl. 29, figs. 1–2, 4, 7, 9; pl. 30, fig. 1; pl. 33, fig. 1.

Stromata hemispherical to globose, sessile to stipitate, single or coalescing, 1.1–10 x 1–7 x 1–7 cm., rubiginous when young, erumpent from the bark or superficial on decorticated wood. Ectostroma moderately thin, "Dark Vinaceous Brown," "Sorghum Brown," "Hay's Brown," "Drab," "Army Brown," or more frequently "Vinaceous Brown," later becoming black and either dull or shiny. Entostroma densely fibrous, persistent, conspicuously concentrically zoned, the lighter "Dilute Snuff Brown," "Fuscous," "Hair Brown," "Benzo Brown," or "Deep Mouse Gray" zones up to three times wider than the darker "Bone Brown" zones. Perithecia usually monostichous, rarely polystichous, claviform to subclaviform, 518–1776 x 185–592 μ, the walls 14.8–37 μ thick. Ostioles punctiform to somewhat prominent. Ascospores inequilaterally ellipsoid, brown, the ends sometimes of a lighter color and more refractive, (8)–12.8–14.4–(20.8) x (4.8)–6.4–(8) μ. Conidia ellipsoid, hyaline, 2.4–3.2 x 4.8–6.4 μ.

On wood of a wide variety of deciduous trees. Cosmopolitan.

Bolton described this species in 1789, and since that time it has been glorified and belittled by various descriptions and synonyms. Persoon[23] described the variety *pedicellata* of *Sphaeria concentrica*, but in his figure 4 the longitudinal section of the fruiting body clearly shows the entostroma to be white, and, together with the characters of the fruiting body as a whole, shows that the variety should be considered as synonymous with *D. vernicosa*. In referring to the figures in the text (p. 8, β), Persoon refers to the variety *pedicellata* of the plate as variety *stipitata*. Variety *obovata* is also ascribed to this writer by Fries,[24] but this is an obvious misunderstanding which apparently resulted from the fact that the first word of an indented line was "obovata." Fries also linked Nees with this error, and in 1882 Saccardo[25] also ascribed the variety to Nees and mentions that it is close to *D. vernicosa*.

Fries[26] makes *Hypoxylon durissimum* (Schw.) Berk. a synonym of *Sphaeria concentrica*, but Cooke[27] says that the species should be considered synonymous with *Hypoxylon marginatum*. A photograph of the exterior and a preparation of ascospores from the type have been studied by the writer who is inclined to follow Cooke's belief, at least as far as the generic status is concerned.

The fruiting bodies of this species are fairly constant in their macroscopical appearance, but exceptionally, when the species grows on soft porous wood such as birch, they attain a greater size. The ascospores of these large forms, however, are in agreement with those of the typical material. As has been previously noted (p. 442) the spores from European material tend to be somewhat larger than those of typical American material, although they are in general agreement, and hence it seems to the writer that the creation of a variety is scarcely warranted.

Specimens examined:

EXSICCATI: Allescher & Schnabel, Fungi Bavarici, 76; Bartholomew, Fungi Columb., 2013; Cooke, Fungi Brit. Exsicc. I, 669; Cooke, Fungi Brit. Exsicc. II, 216; de Thümen, Myc. Univ., 10883; Fries, Scleromyceti Sueciae, 141; Karsten, Fungi Fennici, 265; Linhart, Fungi Hungarici, 261; Plowright, Sphaer.

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[23] Persoon, C. H. Syn. Meth. Fung. **1**: 8. *pl. 1, figs. 3–4.* 1801.

[24] Fries, E. *l. c.* 1823.

[25] Saccardo, P. A. Syll. Fung. **1**: 393. 1882.

[26] Fries, E. Nov. Symb. Myc. 114. 1851.

[27] Cooke, M. C. Grevillea **11**: 131. 1883.

Brit., 17; Ravenel, Fungi Caroliniani, Fasc. III, 49; Roumeguère, Fungi Gall. Exsicc., 3946; Torrend, Fungi Sel. Exsicc., 142.

CANADA: Quebec, Lake St. John, Aug. 1910, *Isabel M. Walker* (L 10908); *G. Ducharne* (L 12300); Ontario, *Isabel M. Walker* (L 10915); London, on decaying wood, July 1904, *John Dearness, 2013* (F); Toronto, July 1908, *Thos. Langton* (L 10926).

UNITED STATES:

Maine: Milo, on alder, Aug. 18, 1920, *C. L. Shear* (S 5582); Mt. Katahdin Trail, on *Fagus* log, Aug. 21, 1920 (S); *C. C. Hanmer* (L 11055).

New Hampshire: Hanover, on *Alnus*, Sept. 30, 1902, *A. H. Chivers* (F); Grantham, *Kate Jones* (L 10886, 12301); Hebron, on *Ulmus* post, *Mrs. R. D. Randlett* (L 10660).

Vermont: Middlebury, Oct. 1910, *C. G. Lloyd* (L 10918); Pawlett, on *Betula papyrifera*, April 17, 1925, *D. H. Linder, 598* (Li); Winooski, *D. B. Griffin* (L 10939).

Massachusetts: Waltham, Sept. 7, 1913, *G. E. Morris* (L 10916).

Connecticut: Morris, Aug. 1915, *B. O. Dodge* (PDS); without locality, *T. H. MacBride* (Ia 1345).

New York: Adirondacks, *F. H. Ames* (L 10874), *E. Knäbel* (L 10818, 10903); Berne, on maple, Aug. 31, 1925, *C. L. Shear* (S); Brooklyn, Oct. 24, 1914, *F. H. Ames* (L 10873, 10906); Buffalo, *G. W. Clinton* (F, PDS); Long Island, *G. C. Fisher* (L 10921); Orient, on *Quercus*, Aug. 19, 1921, *Roy Latham* (L 12177); Ithaca, on *Hamamelis virginiana*, April 30, 1893, *Atkinson* (MBG 15977), Oct. 2, 1910, *F. A. Wolf, 60* (PDS); July 10, 1901, *C. O. Smith* (PDS); Syracuse, *L. H. Pennington* (L 10819); Watkins, on *Ulmus* stumps, July 2, 1892, *D. G. Fairchild* (PDS).

New Jersey: Newfield, *J. B. Ellis* (PDS); Trenton, *E. B. Sterling* (L 10922).

Pennsylvania: Philadelphia, *Mrs. Hannah Streeter* (L 10917, 10933); Mauch Chunk, Sept. 13, 1914, *C. J. Humphrey* (L 10808); without locality, *Eliz. C. Cox* (L 10825).

Maryland: Analostan Island, on rotten *Celtis*, Sept. 14, 1919, *C. L. Shear* (S); Baltimore, *Chas. C. Plett* (L 10931); Grand Falls, April 19, 1925, *F. T. Eagan* (PDS); High Island, on

Betula nigra, July 29, 1922, *A. E. Jenkins* (PDS); Island Park, Sept. 16, 1918, *C. L. Shear* (S), on wild *Vitis,* Sept. 16, 1918, *C. L. Shear* (S); Leitersburg, *W. T. Lakin* (L 10884); Mid River Island, on bark, July 4, 1924, *F. T. Eagan* (PDS 66346); North Beach, June 11, 1922, *E. K. Cash* (PDS); Oakland, Sept. 17, 1917, *C. L. Shear* (S), on *Crataegus,* Sept. 17, 1917, *C. L. Shear* (S 5583), on young and old maple logs, Sept. 17, 1917, *C. L. Shear* (S); Oxen Run, on *Carpinus,* Oct. 21, 1921, *J. R. Weir* (PDS); Plummers Island, on *Acer,* Sept. 28, 1919, *C. L. Shear* (S); Sycamore Island, on *Rhus,* May 15, 1927, *A. E. Jenkins* (PDS).

District of Columbia: Rock Creek Park, on *Platanus occidentalis,* Sept. 24, 1916, *H. R. Rosen & E. H. Siegler* (PDS), *E. Knäbel* (L 10935), on *Quercus alba,* June, 1912, *J. R. Weir, 7462* (PDS).

Virginia: Arlington Farm, Dec. 1916, *C. L. Shear* (S); Black Pond, Aug. 13, 1922, *E. K. Cash* (PDS); Clarendon, on *Acer rubrum,* April 6, 1923, *W. W. Diehl & J. R. Weir* (PDS), on *Acer* ?, March 11, 1923, *J. R. Weir* (PDS), on *Acer rubrum,* Jan. 3, 1926, *J. R. Weir* (PDS), on *Diospyros virginiana,* Oct. 10, 1926, *J. R. Weir* (PDS 66660); Dead Run, Fairfax Co., Sept. 30, 1923, *E. K. Cash* (PDS); Great Falls, on *Acer saccharinum,* Aug. 12, 1926, *J. R. Weir* (S), on *Acer Negundo,* Oct. 30, 1925, *F. T. Eagan, 441* (PDS); without locality, apple orchard, *A. M. Beckwith* (PDS).

North Carolina: Canton, *William Holden* (L 10909); Chapel Hill, on dead birch, fall of 1928, *Andrews* (NC 8259), on bark of deciduous trees, Sept. 1922, *W. C. Coker* (NC 5399); Winston Salem, on decaying stump, Aug. 1922, *Dr. Shallert* (NC 8555); Waynesville, on osage orange, *Mary Fitzgerald* (L 10940, 10943).

South Carolina: Pisgah, on *Betula lutea,* July 16, 1910, *A. H. Graves* (L 11877); Pee Dee River, Nov. 7, 1920, *C. L. Shear* (S).

Alabama: Auburn, on willow, Nov. 25, 1897, *F. S. Earle* (MBG 16365), 1896, *Underwood* (Ia); Montgomery, *R. P. Burke* (L 10907).

Ohio: Adams County, May 4, 1930, *A. H. W. Povah* (Po);

Barnesville, *Emma E. Laughlin* (L 10885); Cincinnati, July 1884, *Dr. Byrones* (PDS), Oct. 2, 1919, *H. Cugner* (PDS 6581), Sept. 8, 1920, *C. G. Lloyd* (L 11765); Linwood, Aug. 26, 1920, *C. G. Lloyd* (L 10820); Mineral Springs, May 4, 1930, *A. H. W. Povah* (Po 3); Norwood, July 1897, *C. G. Lloyd* (L 10945); Oberlin, *Emma J. Carl* (L 10924); Oxford, small logs, Oct. 12, 1920, *B. Fink, 1048* (PDS, F); Salem, *B. Leeper* (L 10864); Toledo, *W. R. Lowater* (L 11794), *Mrs. Albert J. Wolfert* (L 10888).

West Virginia: Cooper's Rock, on *Betula lenta* (?), July 28, 1907, *C. L. Shear, 3048* (PDS); Eglon, Sept. 5–10, 1915, *C. G. Lloyd* (L 10914); Fairmont, *Rev. A. Boutlou* (L 10811, 10812, 10835, 10853, 10887); Fayette Co., April 15, 1893, *L. W. Nuttall, 905* (PDS).

Michigan: Ann Arbor, on *Acer rubrum*, Sept. 10, 1894, *L. N. Johnson* (Po 229a), on *Betula* logs, July 1914, *E. B. Mains* (PDS 12388); East Lansing, *E. A. Bessey* (L 10822); Rock River, on *Alnus*, Aug. 24, 1927, *A. H. W. Povah* (Po 229d).

Indiana: Scottsburg, 1907, *J. R. Weir, 8964* (PDS), on *Hicoria ovata*, May 1901, and June 1912, *J. R. Weir, 2751, 7433* (PDS).

Kentucky: Crittenden, Oct. 5, 1914, *C. G. Lloyd* (L 10937); Lexington, *H. Garman* (L 10905).

Wisconsin: Dells, June 1927, *A. H. W. Povah* (Po 1); Hayward, Sept. 30, 1919, *C. J. Humphrey* (L 10810); Madison, on *Acer*, Aug. 9, 1920, *E. E. Hubert* (L 10807); River Falls, Oct. 1887, *F. H. King* (MBG), Oct. 1887, *Wm. Trelease, 2* (MBG).

Illinois: Evanston, Sept. 29, 1928, *H. Fox* (Po 229); without locality, *MacDougal* (L 10852).

Iowa: Decorah, on logs, Sept. 5, 1885, *E. W. D. Holway* (PDS); Decatur Co., Nov. 6, 1900, *R. L. Smith* (Ia 1350); Fairfield, *J. F. Clarke* (L 10934); Fort Dodge, *O. M. Oleson* (L 10850); Iowa City, *J. A. Perish* (Ia), July 29, 1923, *G. W. Martin* (Ia 1174); Spirit Lake, July 16, 1926, *G. W. Martin* (Ia 1077); Turkey Creek, Johnson Co., July 12, 1902, *B. Shimek* (Ia 1349).

Missouri: Creve Coeur, St. Louis Co., on wood, Aug. 7, 1891, *Dr. Lind* (?) (MBG 16363); Dixon, on *Betula*, Aug. 1930, *Marion Child* (MBG), on *Platanus*, Aug. 1928, *Marion Child* (MBG); Meramec, on old wood, Nov. 1905, *P. Spaulding* (MBG); Pleasant Valley, St. Louis Co., on *Betula*, Sept. 1928, *Marion Child* (MBG); St. Louis, Forest Park, on *Ulmus*, Oct. 17, 1896, *H. von Schrenk* (MBG 43049), on dead trunks, July 4, 1898, July 19, 1902, *H. M. Glatfelter, 50* (MBG).

Nebraska: Weeping Water, April 19, 1924, *L. V. Walker* (W).

Texas: Houston, on fallen limbs, 1869, *H. W. Ravenel* (PDS).

EUROPE:

England: Kings Lynn, Norfolk, on decayed *Fraxinus excelsior*, 1874, *C. B. Plowright, 69* (F, PDS, Ia, St, L 10883), *C. B. Plowright, 216* (F); Crediton, on felled trees, Nov. 21, 1904, *Mrs. A. Montague* (L 10893); Dewesbury, on *Fraxinus*, *E. M. Wakefield* (PDS); Lancashire, Oct. 8, 1910, *H. J. Wheldon* (L 10872); London, *E. M. Holmes* (L 10828, 10895); *M. C. Cooke, 669* (F); Somerset, on dead trunks, June 1875, *Mac Owan & Tuck* (St 17); Southhampton, *M. C. Potter* (L 10894).

France: Pas-de-Calais, *C. Cepede* (L 10871, 10877); Seine-et-Oise, March–Aug. 1886, *F. Sarrazin* (MBG 16366).

Germany: Munich, on *Alnus glutinosa*, May 1910, *J. R. Weir, 2750* (PDS), on *Fagus*, 1910, *J. R. Weir, 2756* (PDS); Oberammergau, Aug. 1889, in Fungi Bavarici, *Schnabel, 76* (F, St 32); Reigenwalsermunde, on *Alnus incana*, 1892, *P. Sydow* (St 8); without locality (St 21).

Austria: Vorarlberg, on beech, winter, 1898, *J. Rick, 1228* (F, St); Wiener Wald, Nov. 3, 1890, *von Höhnel, 4350* (F).

Sweden: Bygget, *C. G. Lloyd* (L 10898); Upsala, 1909, *C. G. Lloyd* (L 10879).

Finland: Kuusamo, *Karsten, 265*, in Fungi Fennici (F).

Switzerland: 1821, *Fries, 141*, TYPE collection (F).

Italy: on *Alnus glutinosa*, 1923, *Bresadola* (PDS); Lombardy, 1889 (PDS); Trieste, on trunks of various dead trees, Sept. 1874, *Saccardo, 697* (PDS); without locality, *Cesati, 600* (F).

Rumania: Siebenbürgen, on *Betula alba*, Aug. 1883, *Linhart, 216*, in Fungi Hungarici (PDS, F).

Jugo-Slavia (Serbia): immature specimen (St).

Russia: Novogorad, Prov. of Bologoi, on *Acer platanoides*, July 6, 1918, Aug. 30, 1918, *W. Tranfeschel* (St 35, 129).

AFRICA:

Egypt, on *Betula alba*, Aug. 1883, *Römer, 261* (F).

ASIA:

Siberia: Prov. of Omsk, Tara Distr., on limbs of *Betula verrucosa*, Sept. 7, 1921, *Murashinsky* (PDS).

China: *Prof. H. H. Hu* (L 35857).

PACIFIC ISLANDS:

Japan: Iwanai, on rotten wood, July 12, 1916, *A. Yasuda, 7611* (PDS); Nayege, on dead *Pavonia cuspidata*, Aug. 1912, *Takisanjo Mikava* (L 10881); Sendai, May 1913, *A. Yasuda* (L 10880); Sakawa, Tosa, May 1919, *Prof. T. Yoshinaga* (L 10817).

Island of Timor: on trees, 1910, *M. Ferreina* (F).

AUSTRALIA: Victoria, on dead stump of dogwood, Oct. 1911, *Jas. Wilson* (L 10878).

2. **Daldinia occidentale** Child, sp. nov.

Pl. 27, fig. 6; pl. 28, fig. 3; pl. 32, fig. 4.

Stromata hemisphaeroidea vel subglobosa, sessilia, raro substipitata, carbonacea, plerumque solitaria, raro confluentia, 2.5–8 x 2–7 x 1–3.5 cm.; ectostromatibus tenuibus fragilibusque, primum "Hay's Brown" deinde "Deep Vinaceous Brown" demum obscure atris vel aereo-atris; entostromatibus fibroso-nemorosis, persistentibus, zonatis, zonis subaequalibus, zonis pallidioribus "Drab," "Tawny Olive Cinnamon," "Hair Brown" vel saepius "Benzo Brown," mollibus vel nemorosis, persistentibus, zonis obscurioribus "Bone Brown," "Fuscous" vel atris; perithecíis monostichis vel polystichis, irregulariter pyriformibus, 518–1554 x 185–518 μ; ostiolis punctiformibus vel minute papillatis, plerumque papillatis; sporidiis fuscis, ellipsoideis vel inaequilateraliter ellipsoideis, (9.6)–12.8–(19.2) x (4.8)–6.4–(8)–(9.6) μ.

Stromata hemispherical to subglobose, sessile or rarely substipitate, carbonaceous, usually single or occasionally confluent, 2.5–8 x 2–7 x 1–3.5 cm. Ectostroma at first "Hay's Brown," then "Deep Vinaceous Brown" and finally dull black or shiny bronze-black, thin, extremely carbonaceous and brittle, cracking off and exposing the tips of the perithecia. Entostroma fibrous-woody, persistent, conspicuously zonate, the zones subequal, the darker ones "Bone Brown" or brownish-black, alternating with lighter zones of "Drab," "Tawny Olive Cinnamon," "Hair Brown," or usually "Benzo Brown" or "Fuscous," soft to woody, persistent. Perithecia monostichous, less frequently polystichous, irregularly pyriform, 518–1554 x 185–518 μ, the wall 14.8–44.4 μ thick; the ostioles punctiform to prominent, mostly prominent. Ascospores ellipsoid to inequilaterally ellipsoid, fuscous, (9.6)–12.8–(19.2) x (4.8)–6.4–8–(9.6) μ. Conidia ellipsoidal, hyaline, borne singly or in whorls, 4–6 x 2–3 μ.

On wood of deciduous trees. Central to western North America, Chile, Tasmania, and New Zealand.

This species, called *Daldinia* "Y" in a previous paper,[28] although closely related to *D. concentrica*, differs from it quite markedly when a series of specimens are studied. Not only are the fruiting bodies unlike, but the asexual conidia are also somewhat larger. In addition to such characters, there is the difference in the physiological behavior of the two species. It is therefore felt that the creation of this new species is fully warranted. See also fig. 4.

Lloyd[29] apparently recognized that the western American material that had been known as *D. concentrica* differed somewhat from the typical form and published it without description as *D. concentrica* forma *californica*. This material was from Washington State where *D. grande* is also found. Another specimen, from Idaho (12379), he labelled *D. confluens* because of its manner of growth. As far as the writer is aware, however, this species has not been published.

Specimens examined:

CANADA:

Ontario: London, on decaying wood, July 1904, *J. Dearness, 2013* (PDS, St), on *Pyrus sambucifolia*, Aug. 7, 1880, *C. G. Pringle, 1161* (F, St 27), *Rev. H. Dupret* (L 12312).

British Columbia: Bendigo, Victoria, June 1918, *E. J. Summers* (L 10806).

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[28] Child, M. Ann. Mo. Bot. Gard. **16**: 411–486. 1929.

[29] Lloyd, C. G. Myc. Writings **5**: 23–26. *figs. 1452–1453.* 1919.

United States:

Michigan: Vermilion, on dead birch stump, July 30, 1914. *A. H. W. Povah* (Po 229c), June 27, 1914, *A. H. W. Povah* (Po 617).

Wisconsin: Madison, Oct. 1901, *M. B. Nichols, 4* (St).

Minnesota: Cass Lake, on *Tilia americana*, June 1912, *J. R. Weir* (F); Minneapolis, *Mrs. M. S. Whetstone* (L 10911, 10912, 10930), *Daisy Hone* (L 10913, 10927); Monticello, *E. P. Ely* (L 10928, 10929).

North Dakota: on old log, Feb. 1897, *Prof. V. Reed* (F).

South Dakota: Black Hills, 1903, *von Schrenk*, TYPE (MBG 43121); Custer, on *Quercus* sp., Aug. 1, 1918, *J. R. Weir, 10857* (PDS).

Montana: Boulder, on *Populus trichocarpa*, Sept. 16, 1917, *F. S. Wolpert* (PDS, MBG 58395); Shelby, on standing *Alnus pyrifolia*, Oct. 13, 1911, *J. R. Weir, 6295* (PDS); Melrose, on *Salix* sp., Oct. 6, 1919, *E. E. Hubert* (PDS); Missoula, on *Acer* sp., 1913, *J. R. Weir, 6295* (PDS); Logan, on burned *Betula granulosa*, May 6, 1928, *P. A. Young, 76* (PDS).

Colorado: Eldorado, on dead *Populus tremuloides*, May 1913, *E. Bethel* (L 35856); Grand Mesa, Sept. 11–18, 1929, *F. J. Seaver & P. F. Shope* (NY 567).

Idaho: Boise, on limb of bearing *Pyrus Malus*, April 15, 1916, *E. P. Taylor, 1847* (PDS); Priest River, on fire-killed saplings of *Betula occidentalis*, Aug. 3, 1920, *A. S. Rhoads, 16434, 16440* (PDS), on *Betula papyrifera*, Aug. 28, 1920, *A. S. Rhoads, 16648* (PDS), on *Betula papyrifera*, Aug. 3, 1920, *A. S. Rhoads, 16450* (PDS), on *Alnus tenuifolia*, Aug. 10, 1920, *A. S. Rhoads, 16435* (PDS), on *Alnus tenuifolia*, Aug. 7, 1920, *J. R. Weir, 15055* (PDS), on *Alnus*, *J. R. Weir* (L 12379), on *Alnus tenuifolia*, June 1914, and Sept. 1914, *J. R. Weir, 2753, 2754, 7444* (PDS); Salmon, on *Populus trichocarpa*, July 15, 1917, *F. S. Wolpert, 7048* (PDS), on *Salix* sp., July 15, 1917, *F. S. Wolpert, 6851* (PDS); St. Maries, on *Populus trichocarpa*, Sept. 9, 1913, *J. R. Weir, 7817* (PDS).

Washington: Bellingham, on *Alnus rhombifolia*, Oct. 1913, *J. R. Weir, 2748* (PDS); Newport, on *Alnus tenuifolia*, Aug. 21, 1920, *A. S. Rhoads, 16613* (PDS); Metaline Falls, on fire-killed standing *Betula papyrifera*, Aug. 27, 1920, *A. S. Rhoads, 16865* (PDS); Yakima, on prune branch, 1922, *Brooks* (S); Langley, 1922, *J. M. Grant* (PDS); Marysville, on *Alnus*, 1922, *J. M. Grant* (MBG 64435); Sequim, *J. M. Grant* (L 10936, 12378); Spokane, on *Betula papyrifera*, Aug. 8, 1924, *C. R. Stillinger* (L 11796).

California: Monterey, *T. H. MacBride* (Ia 1347), 1894, *T. H. MacBride* (Ia 1348); San Bernardino, May 30, 1899, *S. B. Parish* (L 10932), on fire-killed *Salix* sp., Feb. 13, 1920, *E. Bethel* (L 35855); Santa Paula, on *Citrus* tree, 1912, *H. S. Fawcett* (L 10925).

SOUTH AMERICA:

Chile: Santiago, on trunks, *M. R. Espinosa* (L 10920); Danquilco, Rio Puelo, on dead trunks, Jan. 1916, *M. R. Espinosa, 28* (PDS).

TASMANIA: Aug. 1889, *L. Rodway* (L 10843).

NEW ZEALAND: Caversham, *W. A. Scarfe* (L 10899); Christchurch, *Rev. J. Mitchell* (L 11759); Dunedin, *Helen K. Dalrymple* (L 10815); Otira, *E. Cheel* (L 10832); Waikanini, *W. E. Barker* (L 10844), *S. Duncan* (L 10896); Wellington, Island Bay, *Jessie Dunn* (L 10897); without locality, Oct. 1911, *W. E. Barker* (L 10900).

3. **Daldinia grande** Child, sp. nov.

Pl. 27, fig. 8; pl. 28, figs. 7–8; pl. 30, fig. 8; pl. 32, fig. 3.

Stromata sessilia, subhemisphaeroidea, late confluentia, carbonacea, nemorosa, 1.2–14 x 1.5–7.5 x 1–5 cm.; ectostromatibus primum "Dark Vinaceous Brown" deinde obscure atris vel aereo-atris, valde fragilibus; entostromatibus dense fibrosis, persistentibus, manifesto zonatis, zonis obscurioribus "Fuscous Brown" vel "Bone Brown," zonis pallidioribus "Drab," "Hair Brown" vel "Benzo Brown," mollibus vel dense fibrosis persistentibusque, 2–3-plo latioribus; peritheciis monostichis vel polystichis, praecipue polystichis, pyriformibus vel subclaviformibus, 518–1850 x 185–740 μ; ostiolis raro punctiformibus, saepe prominentibus, mammiformibus; sporidiis ovoideis vel inaequilateraliter ellipsoideis, dilute fuscis vel atro-fuscis, (8)–14.4–16–(27.2) x (6.4)–8–(11.2) μ.

Stromata sessile, flattened-hemispherical, usually broadly confluent, carbonaceous, woody, 1.2–14 x 1.5–7.5 x 1–5 cm. Ectostroma at first "Dark Vinaceous Brown," finally dull black to bronze-black, extremely brittle. Entostroma densely fibrous, persistent, conspicuously zonate, the darker zones "Fuscous" to "Bone Brown," the lighter zones 2–3 times broader, soft to fibrous, "Drab," "Hair Brown," or "Benzo Brown." Perithecia monostichous or polystichous, pyriform to subclaviform, 518–1850 x 185–740 μ, the walls 14.8–59.2 μ thick; ostioles rarely obsolete or punctiform, usually prominent and mammiform. Ascospores ovoid, ellipsoid to inequilaterally ellipsoid, the ends bluntly rounded, fuscous to deep fuscous, (8)–14.4–16–(27.2) x (6.4)–8–(11.2) μ.

On wood of various deciduous trees. Western United States, Ecuador, Australia, and New Zealand.

This species differs from the preceding in that the perithecia are polystichous as a rule rather than as an exception; the ostioles are more prominent as papillate or mammiform protuberances on the surface of the stroma; and the spores are somewhat larger and more bluntly rounded at the ends.

Specimens examined:

UNITED STATES:

Minnesota: Cass Lake, on roots of living *Tilia americana*, *J. R. Weir, 2752* (PDS).

Montana: Melrose, on *Salix* sp., Oct. 6, 1919, *E. E. Hubert* (PDS).

Colorado: on aspen, *Ernest Knäbel* (L 10826, 10944).

Arizona: Soldiers Camp, Coronado National Forest, on dead *Populus tremuloides*, *G. G. Hedgcock* (L 11769).

Washington: Bellingham, on *Acer macrophyllum*, 1914, *J. R. Weir, 2755* (PDS); Langley, 1922, *J. M. Grant* (PDS); without locality, 1912, 1916, *T. H. MacBride* (Ia).

California: Sacramento, on cottonwood stump, April 1909, *Miss Sutcliff* (L 10941); San Bernardino, on *Salix*, May 24, 1920, *E. Bethel* TYPE (Sh); San Francisco, Golden Gate Park, on *Acacia* sp., Oct. 16, 1910, *W. T. Swingle* (PDS); Victorville, on dead area of *Salix Gooddingii*, April 4, 1918, *E. Bethel* (L 11768); southern California, 1899, *S. B. Parish* (Ia 1346).

South America:

Ecuador: Quito, *Rev. L. Mille* (L 10829); *N. Nuñez* (L 10831).

Australia: East Caulfield, *J. T. Paul* (L 10838, 10919).

New Zealand: Christchurch, *J. Mitchell* (L 11795); Dunedin, *E. P. Northcroft* (L 12296); Tapanui, Otago, *R. G. Robinson* (L 10889) Waikawa, *W. E. Barker* (L 10901).

4. **Daldinia Eschscholzii** (Ehrenb.) Rehm, Ann. Myc. **2**: 175. 1904.

Sphaeria Eschscholzii Ehrenberg, Fungi Cham. 89. *pl. 18, fig. 8.* 1820.

Daldinia concentrica var. *Eschscholzii* (Ehrenb.) Rehm, Ann. Myc. **2**: 175. 1904.

Daldinia vernicosa f. *microspora* Starbäck, Kongl. Svensk Vet-Akad. Handl. III. **27**^{9}: 6. 1901, sense of Theissen.

Daldinia concentrica var. *microspora* (Starb.) Theissen, Ann. Myc. **7**: 3. 1909.

Daldinia corrugata Patouillard & Hariot, Bull. Soc. Myc. France **22**: 120. 1906.

Daldinia argentinensis f. *sessilis* Spegazzini, of authors in part, Anal. Mus. Nac. Buenos Aires III. **12**: 345. 1909.

Daldinia luzonensis Rehm, Philippine Jour. Sci. **8**: 260. 1913.

? *Hypoxylon stratosum* Sacc. Syll. Fung. **9**: 544. 1891.

? *Daldinia stratosa* Sacc. Syll. Fung. **22**: 327. 1913.

Pl. 26, fig. 5; pl. 27, fig. 5; pl. 28, fig. 5; pl. 29, figs. 3, 5–6, 8; pl. 31, fig. 1; pl. 33, fig. 3.

Stromata subhemispherical, flattened, solitary or confluent, sessile or substipitate, usually smooth, rarely deeply wrinkled or convolute, 1.5–7 x 1.7–5.5 x .8–4 cm. Ectostroma thin, brittle, usually "Anthracene Purple," "Dark Vinaceous Brown," or "Sorghum Brown," later becoming black, dull or laccate. Entostroma soft to pithy, but persistent, conspicuously concentrically zonate, the lighter zones "Pale Mouse Gray," "Mouse Gray," "Light Drab," "Pale Drab," "Smoke Gray," "Tilleul Buff," "Hair Brown," or "Benzo Brown," radiate-fibrous and two or more times broader than the darker "Bone Brown" or "Fuscous" zones. Perithecia usually monostichous, very rarely polystichous, closely appressed, claviform, 518–1628 x 148–518 μ, the walls 14.8–51.8 μ thick. Ostioles distant, usually obsolete to punctiform, rarely prominent. Ascospores amber-colored to brown, inequilaterally ellipsoid, the ends usually lighter-colored and refractive, (8)–11.2–(14.4) x 4.8–(6.4) μ.

On the wood of various deciduous trees. Tropical or subtropical.

This species is closely related to *Daldinia concentrica*, in that it has a dense, dark-colored entostroma, but aside from this point there is little in common, for the spores are smaller and the perithecia, entostroma, and other characters show evident differences in appearance. However, during the examination of a large number of specimens, it was found that when the frequency of spore sizes was plotted the median fell at 11.2 x 4.8 μ, but within this grouping there were nevertheless four rather distinct classes of spore sizes of the following frequency: 39 collections of which the median size was 11.2 x 4.8 μ; 17 collections at 11.2 x 6.4 μ; 16 collections at 12.8 x 6.4 μ; 9 collections at 12.8 x 4.8 μ. Although there is such a variation in spore size, it is not singular that a species with such a wide distribution should show some variation.

The type of *D. corrugata* from Africa was not available for examination, but several specimens so classified in the Lloyd herbarium proved to be small specimens of *D. Eschscholzii*. Infolding of the stroma, alone, does not seem to be a character of sufficient taxonomic value to warrant its use in the creation of a new species. In the original description, Patouillard and Hariot describe the entostroma as white and zonate. None of the specimens seen by the writer has a truly white entostroma, but rather a light gray one. This point may be one that depends on the personal equation, and hence should not be too strongly stressed. According to Lloyd,[30] this African species is quite close to *D. concentrica* in spite of its corrugated surface. The writer feels that this species should be considered a synonym of *D. Eschscholzii*. Similarly, *D. luzonensis*, of which the type and co-type material were examined, proved to be synonymous with this species.

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[30] Lloyd, C. G. Mycological Writings **5**: 25. *fig. 1454*. 1919.

Specimens examined:

Exsiccati: Klotzsch, Herb. Viv. Myc., 162; Maire, Mycoth. Bor.-Afr., 120; Rehm, Ascomyceten, 1718; Roumeguère, Fungi Select. Exsicc., 5140, 5829; Smith, C. L. Cent. Amer. Fungi, 33; Wright, Fungi Cub. Wright., 818.

United States:

Florida: MacLendons I. (probably Florida), on *Citrus decumana* stump, *W. T. Swingle, 1697* (F, MBG); Gainesville, *N. L. T. Nelson* (L 10923, 10942, 12179), June 4, 1930, and Aug. 1930, *E. West* (MBG); Victoria, Orange Co., on felled maple, July 20, 1919, *C. H. Baker, 557* (L); on grubbed orange stump, Dec. 20, 1923, *A. S. Rhoads* (L 11771); on *Citrus Bigaradia*, April 25, 1892, *W. T. Swingle* (PDS).

Louisiana: St. Martinsville, on rotten hardwood limb, June 24, 1911, *C. J. Humphrey* (L 10809); Pointe à la Hache, on decaying log, July 1886, *Rev. A. B. Langlois, 825* (F), Aug. 1896, *Langlois, 829* (PDS).

Texas: Feb. 23, 1921, *N. L. T. Nelson, 1* (L 10814, St); Austin, Dec. 1930, *G. W. Goldsmith* (T).

Mexico: Vera Cruz, *C. L. Smith, 1351* (Ia).

Central America:

Nicaragua: Los Amates, Feb. 20, 1907, *W. A. Keller* (PDS); Ometepe, Jan.–Feb. 1893, *C. L. Smith, 33* (F); Castillo Viejo, Feb.–Mar. 1893, *C. L. Smith, 78* (PDS).

Honduras: La Ceiba, May 1923, *C. M. Sutter* (MBG 18576); Tela, on dead tree trunks, Jan. 17, 1923, *O. A. Reinking* (L 12294).

West Indies:

Cuba: Ciego, on dead roots, Dec. 5, 1924, *J. R. Weir, 66519* (PDS), on dead roots in cane field, Dec. 5, 1924, *J. R. Weir, 6519* (F); Consolacion, on fallen trunk, Dec. 1, *C. Wright, 818* (F); Guantanamo Oriente, July 1920, and Dec. 28, 1920, *B. Hioram, 16579, 17769* (PDS); Palo Seco, on *Citrus*, Dec. 13, 1915, *J. A. Stevenson, 2757* (PDS); Santa Clara, Nov. 23, 1924, *J. R. Weir* (S); Santiago de las Vegas, Dec. 10, 1915, *J. R. Johnston, 1335* (S); Trinidad, Nov. 24, 1924, *J. R.*

Weir, 64816 (PDS); without locality, *C. G. Lloyd* (L 10836, 10839, 10847).

Porto Rico: Pueblo Viejo, on rotten stumps, Jan. 1915, *J. A. Stevenson, 2525* (PDS); Rio Piedras, on logs, Dec. 4, 1915, *B. Fink, 657* (PDS); San Juan, on dead *Citrus* stump, March 1, 1917, *H. E. Thomas, 8* (S); without locality, Feb. 30, 1919, *F. S. Earle, 247* (S), Dec. 6, 1920, *F. S. Earle, 309* (PDS).

Jamaica: *Wm. Chadwick* (L 10868).

Bahamas: *L. J. K. Brace* (L 10813, 10830, 12302, 12406); *A. D. Machado* (L 12385).

St. Croix: Jolly Hill, 1905–06, *C. Raunkiaer, 1711a* (B).

SOUTH AMERICA:

Argentina: La Plata, on *Quercus ruber*, Dec. 1923, *J. R. Weir* (PDS); Rio Pescado, Jujuy, on decayed trees, March 1905, *Spegazzini* (A), (1).[31]

Bolivia: Tatarenda, Gran Chaco, March 4, 1902, *Robt. E. Fries, 408* (St).

Brazil: *J. Rick* (L 12303); Leno Agul (?), 1923, *J. Rick* (L 10851); Bahia, June 1915, *C. Torrend, 15811* (PDS); Matto Grosso, Cuyabá, May 13, 1894, *G. O. Malme, 0595* (St).

EUROPE:

France: Dijon, Côte d'Or, 1904, *M. Barbier* (L 10841).

Germany: Nassau, in forest of Hattersheim, *Fuckel, 305* (F, PDS, St).

AFRICA:

Algiers: on trunk of dead *Eucalyptus*, Feb. 3, 1913, *R. Maire, 120* (PDS, St); on trunks, Oct. 1889, *L. Trabut, 5140* (F); Coomassee, *T. Hunter* (L 10846).

Liberia: on burnt stump, July 25, 1926, *D. H. Linder, 167* (F); Mt. Barclay, on charred stumps and logs, July 20, 1926, *D. H. Linder* (F); *T. Hunter* (L 10823).

Gold Coast: Abeesé, *R. H. Bunting* (L 10834).

Nigeria: 1917, *Farquharson, 5* (PDS).

São Thomé I.: on fallen trunks, *O. Möller, 5829* (F).

Congo: (L 10867); *F. Theissen* (L 10938).

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[31] Since the type collection was a mixed collection, having no number, the author has separated the material and put it into packets bearing the numbers 1, 2, and 3. See footnote on page 477.

Angola: Loanda, on dead trees, March 1918, *J. Gossweiler* (L 10849); *J. Gossweiler* (L 12376).

Union of South Africa: Stellenbosch, *Miss A. V. Duthie* (L 10904); Pretoria, *A. J. T. Janse* (L 10875).

Mozambique: Tiembo, April 1913, *A. Truz, 142* (St).

Tanganyika Territory (Dutch East): Tanga, *A. Karansek* (L 10862).

Uganda Protectorate: on logs, Feb. 19, *R. A. Dammer, 1442* (PDS).

Zanzibar: *Chas. A. O'Connor* (L 12180).

MADAGASCAR: *Henri Perrier de la Bathie* (L 10856).

REUNION ISLAND: *E. Dupont* (L 10890).

MAURITIUS ISLAND: *Chas. A. O'Connor* (L 10891).

ASIA:

Syria: Beyrouth, *Rev. A. Boulomoy* (L 10858).

India: Pusa, on old wood, May 14, 1906, *Inayat* (St 1121), on wood, Feb. 1923, *Azmabullah Khan* (PDS), on *Dalbergia Sissoo*, Feb. 1, 1917, *E. J. Butler* (PDS), on same host, Aug. 1910, *J. F. Dastur* (St 1122); Bombay, on old wood, Oct. 3, 1908, *H. M. Chibber* (St 1118); Madras, Oct. 1911, *J. Hornell* (L 10845); Nagpur, (on living ?) *Citrus Aurantium*, Sept. 19, 1908, *Paudit* (St 1115); Burma, on old wood, Jan. 12, 1908, *E. W. Buttel* (St 1120).

Malay Peninsula: Negri Sembilan, on dead *Hevea*, Nov. 22, 1922, *R. E. Holttum* (L 12806); Singapore, on dead log, Dec. 29, 1919, *T. F. Chipp* (L 10821), on dead rubber stump, Nov. 1923, *Abul Vadir* (L 12297).

Bonin Island: 1853, *C. Wright, 56* (F).

China: Kuling, Prov. of Kiangsi, Sept. 8, 1929, *Chung, 4355* (F).

PHILIPPINE ISLANDS: Capez, Panay, Jan. 10, 1904, *E. B. Copeland* (L 10802); Palawan, July 1912, *E. Fenix, 15613* (L 12407, PDS); Leyte, Palo, Jan. 1906, *A. D. E. Elmer* (MBG 705734); March 1909, *A. Celestina, 21* (St); Prov. of Bataan, Luzon, Nov. 1912, *P. W. Graff* (L 10803); Antipalo, Luzon, Oct. 1912, *M. Ramos* (St 16824, as *D. concentrica* var. *microspora*, authentic material, L 10801); Mt. Maquiling, Luzon, on rotten trunks, Jan. 31, 1914, *C. F. Baker, 2723* (St), on dead wood, Oct. 4, 1920, *S. Bacal* (L 10173, PDS), on dead wood, Oct. 3, 1920, *R. Habaluijas* (L 10598), Nov. 1920, *S. Mariano* (L 10686, PDS), on dead wood, Oct. 1920, *O. A. Reinking* (L 10613, PDS), Oct. 3, 1920, *C. Serrano 9934* (L 12182), Oct. 3, 1920, *A. Reyes* (L 10800), on *Garcinia* sp., Nov. 7, 1920, *A. Reyes* (L 10950, PDS), on dead wood, Oct. 1920, *G. Zabella* (L 10919, PDS), Dec. 1919, *H. S. Yates* (L 10587), July 5, 1919, *J. Corrales* (L 10797); Prov. of Nueva Vizcaya, Luzon, Jan. 1913, *McGregor* (PDS 20274); Prov. of Tayabas, Luzon, 1916, *H. S. Yates* (MBG 59960); Manila, *Father Sanchez* (L 11878, St), on *Hevea brasiliensis*, Oct. 1917, *H. S. Yates 96* (PDS); Isla Cruz, Prov. of Laguna, Luzon, on *Citrus decumana*, Feb. 2, 1919, *N. Reyes* (L 10805); Prov. of Calauan, Laguna, on dead wood, Feb. 13, 1921, *F. Bernardo* (L 12292), *O. A. Reinking* (L 12291); Prov. of Rizal, Luzon, Oct. 12, *M. Ramos* (St); Butuan, Subprov. Mindanao, March–July, 1911, *C. M. Weber, 1257* (F); Los Baños, Prov. of Laguna, Luzon, on dead wood, Nov. 7, 1920, *A. Abesans* (L 10852), on rotten trunks, Dec. 1, 1912, TYPE collection of *D. luzonensis* Rehm, *C. F. Baker* (MBG 12465, L 12401), Oct. 2, 1919, *H. Cuzner* (L 10798), on decaying wood, Sept. 25, 1919, *G. O. Ocfemia* (PDS 5944), on bark of *Tamarindus Medicus*, Aug. 5, 1913, *Evaristo, 1562, 1568* (St), on dead wood, March 1919, *E. Quisunging* (PDS 3598), on decaying wood, Sept. 25, 1919, *G. O. Ocfemia* (PDS, Po 229b, L 10799); Benquet, Los Baños, on *Polyalthia*, *O. A. Reinking, 11370* (PDS), on *Celtis*, April 2, 1921, *O. A. Reinking, 11262* (PDS), on dead wood, April 2, 1921, *O. A. Reinking* (L 12290, 12293), on *Dipterocarpus*, April 2, 1921, *O. A. Reinking, 66606* (PDS), on *Macaranga*, April 2, 1921, *O. A. Reinking, 11350* (PDS), on *Citrus decumana*, March 2, 1919, *N. Reyes, 3575* (PDS); Basilan I., Isabela, Dec. 1919, *H. S. Yates* (L 10587).

EAST INDIES:

Java: Cheribon, on *Tamarindus indicus*, 1920, *J. C. van der Meer Mohr* (S), 1922, ex *H. Bigoriensis* (MBG); Pati, on *Dalbergia latifolia* (dead), March 1920, *C. Hartley, 19861* (PDS); Buitenzorg, 1913, *W. P. Thompson* (F), *C. Hartley*, *19661* (PDS); Madiun, Jan. 29, 1922, *Dr. T. A. Tengwall* (L 12299).

Timor Island: *G. Bresadola, 45* (PDS), on trunks, 1916, *M. Feniera, 42* (PDS).

AUSTRALIA: Sydney, *E. Cheel* (L 10827), *W. W. Froggatt* (L 10902), *J. B. Cleland* (L 10876); Grantville, *F. F. Paul* (L 10892); without locality, Dec. 1919, *H. S. Yates* (L 10585, 12409).

Tasmania: *L. Rodway* (L 10816).

PACIFIC ISLANDS:

Samoa: 1904–05, *C. G. Lloyd* (L 10859, 10860, 10869, 12400, 12298); Apiaberg, on *Citrus Aurantium*, May 1905, *Dr. K. & E. Rechinger, 1718* (B, F, PDS, St), authentic material; 1904–05, *W. A. Setchell & H. E. Parks* (L 12298).

Guam: *Peter Nelson* (L 12387).

Tahiti: Tataa, on dead cocoanut, May, 1922, *H. E. Parks* (L 12394), on rotting *Papaya*, June 1922, *H. E. Parks* (L 12295).

5. Daldinia Bakerii Lloyd, Myc. Writings **5**: 25–26. 1919, char. emend.

Daldinia Eschscholzii (Ehrenb.) Rehm, of authors.

Pl. 31, fig. 5.

Stromata subhemisphaeroidea vel subsphaeroidea, plerumque convoluta, solitaria vel confluentia, sessilia vel substipitata, levia vel rugosa plicataque, 1.5–4.5 x 2–4 x 1.2–2.3 cm.; extostromatibus carbonaceis subfragilibus, "Deep Vinaceous Brown" vel "Deep Livid Brown" deinde fulgidis vernicosisque, atris; entostromatibus mollibus, contextis vel fibrosis, persistentibus, manifesto zonatis, zonis obscurioribus "Benzo Brown," "Bone Brown" vel "Fuscous," zonis pallidioribus "Pallid Mouse Gray," "Dark Mouse Gray," "Smoke Gray" vel "Hair Brown," 2–3 plo latioribus; peritheciis plerumque monostichis, raro polystichis, plerumque late claviformibus, 666–8510 x 148–592 μ; ostiolis prominentibus, dense aggregatis, saepe ad bases stromatum majoribus; sporidiis inaequilateraliter ellipsoideis, intus ascos obliquiter monostichis, dilute fuscis vel atro-fuscis, (9.6)–14.4–(24.0) x (4.8)–6.4–(11.2) μ.

Stromata subhemispherical to globose, usually convolute, single or confluent, sessile to substipitate, smooth or wrinkled and infolded, 1.5–4.5 x 2–4 x 1.2–2.3 cm. Ectostroma carbonaceous, somewhat fragile or brittle, "Deep Vinaceous Brown" to "Deep Livid Brown," later becoming black, shining, and laccate. Entostroma soft, pithy to fibrous, persistent, zonate, the lighter zones "Pallid Mouse Gray," "Dark Mouse Gray," "Smoke Gray" to "Benzo Brown," 2–3 times wider than the darker "Benzo Brown," "Bone Brown," or "Fuscous" zones. Perithecia usually monostichous, more rarely polystichous, mostly broadly claviform, widest at apices, but slightly tapering at the base, 666–8510 x 148–592 μ, the wall 22.2–51.8 μ thick; ostioles prominent, close together, frequently more prominent at the base of the stroma. Spores inequilaterally ellipsoid, obliquely uniseriate in the ascus, amber-colored to dark brown, with or without refractive ends, (9.6)–14.4–(24.0) x (4.8)–6.4–(11.2) μ.

On wood of various deciduous trees. Asia, Africa, Philippine Islands, Australia, Costa Rica, Porto Rico, Mexico, West Indies, and South America.

This species is closely related to *D. Eschscholzii*, but because of the wider range in the size of the spores and also their generally larger size, it is considered to be distinct.

Specimens examined:

MEXICO: Mexico City, on *Fraxinus* (*Berlandieriana* ?), June 25, 1924, *Dr. A. Dampf, 6350* (PDS); without locality, *W. A. Murrill, 0313* (L).

CENTRAL AMERICA:

Costa Rica: Estrella Valley, on decayed prostrate log, July 1, 1921, *Paul V. Siggers* (L 12178).

WEST INDIES:

Porto Rico: on old stump, Dec. 7, 1920, *F. S. Earle, 301* (S).

SOUTH AMERICA:

Argentina: Chaco, Prov. of Jujuy, Oct. 6, 1901, *R. E. Fries* (St 053).

Bolivia: Tarija, Jan. 21, 1902, *R. E. Fries* (St 246).

Chile: Chaparro, Limache, Sept. 23, 1927, *Garaventa* (F).

AFRICA:

Natal: Pretoria, Aug. 1918, *J. M. Sim* (L 10824); without locality, *A. J. T. Janse* (L 10870).

ASIA:

Asia Minor: Turkey, Palu, Aug. 1923, *Remp* (PDS).

India: Saharanpur, *Wm. Golden* (L 10857); Cuttack, *Jages Ray* (L 10837); Bengal, *S. Hutchings* (L 10855, 10842); Dadabetta, Oct. 1911 (L 10866); Darjeeling, *G. H. Cave* (L 10863); Pusa, on old wood, April 8, 1906, *Inayat* (St 1124); Cherra Punji, on old wood, May 15, 1905, *E. W. Butler* (St 1119); Nilgiri, on old wood, Aug. 1902, *C. A. Barber* (St 1117).

PHILIPPINE ISLANDS: Luzon, Prov. of Tayabas, Dec. 1916, *H. S. Yates, 25604* (F); Subprov. Panai, Jan. 1915, *M. S. Clemens, 9246* (F); Subprov. Benquet, Jan. 1915, *M. S. Clemens* (MBG 59959); Batangas, on dead branch of *Citrus nobilis*, Oct. 17, 1917 (S); Los Baños, Prov. of Laguna, on dead wood, May 6, 1917, *F. Collado* (PDS 3632).

AUSTRALIA: Sydney, 1901, *R. T. Baker*, TYPE (L 12377).

6. **Daldinia Gollani** Hennings, Hedwigia **40**: 339. 1901.

Daldinia cognata Patouillard & Hariot, Jour. de Bot. **17**: 15. 1903.

Hypoxylon Hibisci Hennings, Hedwigia **47**: 259. 1908.

Daldinia platensis Spegazzini, Anal. Mus. Nac. Buenos Aires III. **12**: 345. 1909.

Daldinia Hibiscus (Henn.) Lloyd, Myc. Writings **6**: 901. *fig. 1587*. 1919.

Pl. 27, fig. 7; pl. 31, fig. 6.

Stromata flattened-hemispherical, turbinate to subglobose, sessile to substipitate, 1–3.5 x 1–4 x .8–1.7 cm. Ectostroma usually rugose, thin, brittle, "Hay's Brown," "Brownish Drab," "Dark Vinaceous Brown," "Anthracene Purple," later dull or laccate and black. Entostroma soft, pithy or fibrous, persistent, concentrically zonate, the lighter zones "Tilleul Buff," "Hair Brown," "Gray White," "Drab Gray," or "Benzo Brown," 1–6 times wider than the darker "Bone Brown" or "Fuscous" zones. Perithecia usually monostichous, rarely polystichous, globose, 444–1250 x 162–518 μ, the walls 22.2–51.8 μ thick; ostioles distant, obsolete, punctiform or slightly papillate. Ascospores inequilaterally ellipsoid, acutely rounded at the lighter colored ends, amber to brown, (6.4)–9.6–(12.8) x (3.2)–4.8–(6.4) μ.

On wood of deciduous trees. Jamaica, Brazil, Argentina, New Caledonia, India, and the Philippine Islands.

This species differs from all others in the *D. concentrica* group by having subglobose perithecia, and conspicuously acutely rounded spores of relatively small size.

Specimens examined:

WEST INDIES:

Jamaica: Balaclava, May 4, 1909, *A. E. Wight, 340* (F).

SOUTH AMERICA:

Brazil: Rio Grande do Sul, Lageado, 1925, *Rick* (PDS 19811); without locality, *Rick* (PDS, L 12383, 12389); Matto Grosso, Sierra da Chapada, June 20, 1894, *G. O. Malme, 5* (St).

Argentina: La Plata, on trunks, Dec. 28, 1906, *Spegazzini*, TYPE of *D. platensis* (A).

ASIA:

India: Siwalik Range, 1600 ft., on *Ficus Carica,* 1900, *W. Gollan, 269,* TYPE (B).

PHILIPPINE ISLANDS: without data (L 12408), probably TYPE of *D. Hibiscus; E. D. Merrill* (L 12403).

NEW CALEDONIA: 1901, *Desmazieres,* TYPE of *D. cognata* (L 12374).

7. Daldinia caldariorum Hennings, Verh. Bot. Ver. Prov. Brandenb. **20**: 158. *pl. 2, fig. 14.* 1897.

Pl. 26, figs. 6–7; pl. 31, fig. 2.

Stromata subglobose, laterally compressed, 5–12 x 5–12 x 5 mm. Ectostroma thin, brittle, at first "Hay's Brown" or "Dark Vinaceous Brown," finally shining black. Entostroma definitely zonate, the lighter zones "Hair Brown," soft, compact, persistent, twice as broad as the "Fuscous" zones. Perithecia monostichous, irregularly pyriform, 666–814 x 296–444 μ; the walls 29.6–37 μ thick. Ostioles obsolete. Ascospores brown, inequilaterally ellipsoid to ellipsoid, (9.6)–11.2–(14.4) x 4.8–(6.4) μ.

On wood of deciduous trees. Germany and Brazil.

Specimen examined:

GERMANY: Berlin Botanical Garden fern house, Dec. 1887, *P. Hennings* TYPE (B). Hennings[32] also reports the occurrence of this species from Brazil.

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[32] Hennings, P. Broteria **5**: 50. 1906.

8. **Daldinia loculata** (Lév.) Sacc. Syll. Fung. **1**: 394. 1882.
Sphaeria loculata Léveillé, Ann. Sci. Nat. Bot. III. **3**: 47. 1845.
Daldinia intermedia Lloyd, Myc. Writings **5**: 23–26. 1919.
Daldinia Murrillii Lloyd, Myc. Writings **6**: 901. *fig. 1588.* 1919.

Pl. 26, figs. 3–4; pl. 30, fig. 4; pl. 32, figs. 1–2.

Stromata globose above, usually rugose, .3–2 x .5–2.3 x .6–2.5 cm., sharply constricted below the perithecia-bearing head to a definite cylindrical stipe, rarely substipitate, usually single, rarely confluent. Ectostroma thin, moderately brittle, at first "Hay's Brown," "Brownish Drab" or "Deep Vinaceous Brown," later becoming black, dull or laccate. Entostroma conspicuously zonate, densely fibrous, persistent, the lighter zones "Benzo Brown," "Hair Brown," or "Fuscous," "Mouse Gray" or "Smoke Color," 2–5 times wider than the darker "Bone Brown" zones. Perithecia monostichous or polystichous, pyriform to irregularly subclaviform, subdistant, 185–518 x 444–1480 µ; ostioles obsolete, punctiform, to rather prominent, distant to subdistant. Ascospores navicular to inequilaterally ellipsoid, amber-color to brown, the ends often lighter in color and refractive, (9.6)–12.8–(19.2) x (4.8)–6.4–(8) µ.

On wood. United States, Mexico, West Indies, Japan.

Of the species with the dense, persistent entostroma, only this one has a definite stipe, and by this character it can be readily recognized.

Specimens examined:

United States:

New York: Menaud, 1845, *J. H. Léveillé*, type (P).

South Carolina: Claw Hammer Cove, Pisgah, on *Hicoria alba*, Aug. 15, 1924, *G. G. Hedgcock* (L 11767); on dead limbs of *Ostrya virginica*, *H. W. Ravenel* (F).

Ohio: Preston, 1896, *A. P. Morgan* (Ia); Akron, *G. D. Smith* (L 12404).

Michigan: East Lansing, *E. A. Bessey* (L 12329).

Wisconsin: Cleveland, *Chas. Golosel* (L 12405).

Minnesota: Princeton, on dead *Carpinus caroliniana*, Sept. 26, 1911, *C. J. Humphrey* (L 12305); Minneapolis, *Mary S. Whetstone* (L 12307).

Iowa: Delaware Co., *B. Shimek* (Ia 1352).

MEXICO: *W. A. Murrill*, TYPE of *D. Murrillii* (L 12402).

WEST INDIES: Jamaica, 1908 and 1909, *A. E. Wight* (F).

ASIA:

Japan: Kobe, *J. E. A. Lewis* (L 11793); Sendai, Mt. Akagi, Oct. 9, 1911, *A. Yasuda* (L 12167).

9. **Daldinia vernicosa** (Schw.) Cesati & de Notaris, Comm. della Soc. Critt. Ital. **1**: 198. 1863.

Sphaeria concentrica var. *stipitata* Pers. Syn. Meth. Fung. **1**: 8. *pl. 1. figs 3–4.* Göttingen, 1801.

Hypoxylon concentricum var. *obovatum* Fries, Syst. Myc. **2**: 331. 1823.

Sphaeria vernicosa Schw. Jour. Acad. Nat. Sci. Phila. **5**: 9. *pl. 1. fig. 2.* 1825.

Sphaeria (*concentrica*) *cingulata* Lév. Ann. Sci. Nat. Bot. III. **3**: 47. 1845.

Hypoxylon (*Pulvinatae*) *vernicosum* (Fr.) Berk. & Curt. Proc. Linn. Soc. Bot. **10**: 384. 1867.

?*Daldinia cingulata* (Lév.) Sacc. Syll. Fung. **1**: 395. 1882.

Daldinia fissa Lloyd, Myc. Writings **7**: 1313. *pl. 306, fig. 2986.* 1924.

Pl. 26, fig. 1; pl. 28, fig. 1; pl. 30, figs. 2, 5; pl. 33, fig. 2.

Stromata subturbinate to turbinate, contracted below into a distinct rugose stipe with annular zones externally visible, stromata usually single, occasionally confluent, fragile, .6–3.5 x .5–2.5 x .8–2.5 cm. Ectostroma thin and carbonaceous, brittle, at first "Hay's Brown, "Cameo Brown," "Van Dyke Brown," "Fuscous" or "Dark Vinaceous Brown," finally shiny or laccate and black. Entostroma conspicuously zonate, the lighter zones usually gray-white, yellowish gray, or "Drab," fibrous, collapsing and loculate, 2–4 times broader than the darker and more persistent "Bone Brown" to black zones. Perithecia monostichous or polystichous, ovoid-oblong to subglobose, 518–1258 x 185–

666 μ, the wall 14.8–37 μ thick. Ostioles punctiform to somewhat prominent. Ascospores usually brown or dark brown, the ends obtusely rounded, (8)–11.2–12.8–(17.4) x (4.8)–6.4–(8) μ. Conidia single or in whorls, subglobose to ovoid, hyaline, 2.4–3.2 x 2.4–3.2 μ.

On wood, frequently charred, of living and dead deciduous trees. Cosmopolitan.

The substipitate, turbinate stroma, together with the light colored entostroma, marks this species.

Daldinia cingulata and *D. fissa* appear to be ill-advised species which were founded on large or abnormal specimens. The writer could find no characters other than that of size to separate the latter species from *D. vernicosa.* From the early descriptions and illustrations, *H. concentricum* var. *obovatum* is clearly synonymous with *D. vernicosa,* and as such it has been pretty generally accepted, although the writer has found some specimens of *D. Eschscholzii* which have been determined as this variety. *Sphaeria concentrica* var. *stipitata* is apparently synonymous with *D. vernicosa.* Plate figures show definite stipitate ascocarps and a marked differentiation of color in the zonation, which was evidently intended to show light gray or white loculate zones alternating with more dense dark ones. The ascocarps of *D. concentrica* are sessile or substipitate and the zones are shades of brown and are more dense than those of *D. vernicosa.*

Specimens examined:

Exsiccati: de Thümen, Fungi Austr., 1154; Ell. & Ev., Fungi Columb., 735; Ellis, N. Am. Fungi, 166; Fairman, Mycoth. Fairmani, 4415; Fuckel, Fungi Rhenani, Suppl., 2468; Linhart, Fungi Hung., 180; Roumeguére, Fungi Gall. Exsicc., 3946; Sacc. Mycoth. Veneta, 153; Sydow, Mycoth. Marchica, 3469.

United States:

New Hampshire: Meredith, Sept. 1924, *Miss Ann Hibbard* (L 11876).

Vermont: Middlebury, Oct. 1910, *C. G. Lloyd* (L 12325).

Massachusetts: Cambridge, on *Fagus*, Sept. 1915, *A. P. D. Piguet, 10* (F); Canton, on *Tupelo*, Oct. 19, 1929, *D. H. Linder* (Li).

Connecticut: Sand Beach, *Miss Ruby Wilbur* (L 12315).

New York: Lyndonville, on old birch poles, autumn, 1920 or 1921, *C. E. Fairman* (S 4415); Syracuse, Aug. 1911, and Sept. 11, 1913, *L. H. Pennington* (L 12319 and 12321).

New Jersey: Newfield, on dead white oak saplings, Sept. 1899, *Ellis* (F), Ellis, N. Am. Fungi, on dead shrubs and trees, *Ellis* (PDS 1175).

Pennsylvania: State College, on dead *Quercus alba*, Aug. 31, 1916, *A. S. Rhoads* (L 11770); Philadelphia, Aug. 31, 1904, *Mrs. G. M. Dallas* (L 12330).

Maryland: Glen Echo Heights, on *Liriodendron tulipifera*, April 19, 1925, *G. G. Hedgcock* (L 11875); Hyattsville, on *Quercus*, Nov. 1, 1885, *F. L. Scribner* (PDS), Nov. 1, 1887, *F. L. Scribner, 441* (PDS); Holland Point, on *Ilex opaca*, March 25, 1923, *A. Marlowe & E. K. Cash* (PDS), on *Cornus florida*, *E. K. Cash* (PDS); Scotland, St. Marys Co., on dead *Ilex opaca*, Sept. 2, 1923, *S. F. Blake* (PDS); Cabin John, on fire-killed *Acer rubrum*, Oct. 21, 1917, *A. S. Rhoads* (L 12386).

District of Columbia: Washington, on dead wood, March 26, 1916, *W. Piper* (PDS), on *Fagus atropunicea*, Aug. 30, 1914, *R. G. Pierce* (PDS 8240); *Dr. A. Hrdlicka* (L 12323).

Virginia: Arlington, on *Quercus*, *Hicoria*, *Liriodendron*, and *Sassafras*, Feb. 22, 1927, *C. L. Shear* (S 5586), on wild grape vine, Dec. 11, 1911, *J. R. Weir, 2760*, (PDS); Clarendon, on fire-scarred *Liriodendron*, Aug. 28, 1926, *J. R. Weir* (PDS), on *Diospyros virginiana*, Oct. 10, 1926, *J. R. Weir* (PDS 66661).

North Carolina: Salem, on posts of garden fence, 1825, *Schweinitz*, TYPE (Pa).

South Carolina: North Augusta, *Berry Benson* (L 12313).

Georgia: Tallulah Falls, Sept. 19, 1901, *A. B. Seymour* (F).

Florida: De Funiak Springs, *G. C. Fisher* (L 12324).

Louisiana (?): on *Quercus macrocarpa*, *A. B. Langlois* (PDS).

Ohio: Akron, *G. D. Smith* (L 12310); Salem, on ash, *B. Leeper* (L 12311); Toledo, *W. R. Lowater* (L 35854), and TYPE of *D. fissa* (L 12382).

West Virginia: Pendleton Co., on *Fagus ferruginea*, Sept. 17, 1904, *A. H. Moore 2321* (F); Fairmont, *Rev. A. Boutlou* (L 12328); Radnor, on burned *Quercus alba*, Nov. 28, 1920, *C. L. Shear* (S).

Michigan: Croton, on dead white oak, Sept. 20, 1914, *C. D. LaRue* (Po 617A, L 12318); Mt. Pleasant, Dec. 1913, *A. E. Jenkins* (PDS).

Indiana: Sandusky, on dead *Quercus alba*, Aug. 17, 1912, *C. J. Humphrey* (L 12317); Scottsburg, on dead *Quercus alba*, *J. R. Weir 21070* (PDS).

Wisconsin: Green Bay, on dry *Fagus*, July 24, 1889, *J. W. Schuette* (PDS); Shawano, on healthy plum limbs, June 14, 1897, *W. S. Wood* (PDS).

Illinois: Evanston, Oct. 4, 1909, *L. H. Pennington* (L 12320).

Minnesota: Minneapolis, *Mary S. Whetstone* (L 12306, 12308); Rochester, *J. E. Greene* (L 12309).

Iowa (?): *T. H. MacBride* (Ia 1419).

Missouri: St. Louis Co., on dead trunk, April 6, 1919, *S. M. Zeller* (MBG 12326); Old Orchard, Oct. 1886, *Pammel* (MBG 66605); *T. H. MacBride* (Ia 1383); Dixon, on fire-killed *Acer rubrum*, July 1928, *Marion Child* (MBG); Lesterville, on charred *Quercus*, Nov. 1926, *L. O. Overholts* (MBG 63847).

North Dakota: Kulm, on *Fraxinus*, Dec. 14, 1913, *J. F. Brenckle, 2758* (PDS, St 678).

Kansas: Fort Riley, on oak poles, Oct. 1917, *J. F. Brenckle, 99* (F, L, PDS).

Texas: College Station, *L. W.* (L 10812).

Montana: Darby, on *Alnus tenuifolia*, July 1915, *J. R. Weir, 6298* (PDS).

Idaho: Priest River, on *Alnus tenuifolia*, Oct. 1915, *J. R. Weir, 2761* (PDS).

Washington: Chelan Lake, on *Alnus tenuifolia*, Sept. 1916, *J. R. Weir, 2759* (PDS).

Oregon: Corvallis, *S. M. Zeller* (MBG).

MEXICO: (Ia 1353); Jalapa, *C. L. Smith* (Ia 1415).

CENTRAL AMERICA:

Honduras: *O. A. Reinking* (L 12316).

WEST INDIES:

Cuba: Oriente, Guantanamo, on lianas, 1918, *B. Hioram, 12486* (PDS).

South America:

Brazil: Minas Geraes, 1877, *F. Noack* (St 267).

Europe:

France: Seine-et-Oise, *F. Sarrazin, 3946* (F).

Italy: Treviso, on dead trees, Sept. 1894 (F), on trees, Sept. 1872, *P. A. Saccardo* (St 18); L. Maggiore, autumn of 1865 (St 361); Vercelli, *Cesati* (St 600).

Germany: Berlin, on trees stumps, 1890–91, *Sydow, 3469* (St, F).

Austria: Eberbach, on *Fagus* trunks, *Fuckel, 2468*, in Fungi Rhenan. (F); on *Alnus*, Oct. 26, 1904, *von Höhnel, 4350* (F).

Hungary: Wieselburg, on *Betula alba*, Nov. 1882, *Linhart, 180* (F).

Rumania: Transylvania, Dec. 1872, *C. Barth, 1154* (F, PDS, St).

Russia: Majkop (?), on fallen logs, *N. Schestunow* (L 10882).

Philippine Islands: Manila, on fallen trunks, 1914, *A. Morgan, 12641* (PDS).

10. Daldinia simulans Child, sp. nov.

Pl. 26, fig. 2; pl. 28, fig. 2; pl. 30, fig. 3; pl. 33, fig. 4.

Stromata elongato-ellipsoidea vel subglobosa, substipitata vel breve-stipitata, plerumque solitaria, raro confluentia, sursum minute sulcata, "Snuff Brown," "Drab," vel "Verona Brown," 5–15 x 14–15 x 9–13 mm; stipitibus sterilibus zonatis, atris, fulgidis; ectostromatibus tenuibus; entostromatibus fibrosis, partim collabascentibus loculatisque, zonatis, zonis atris tenuibus, zonis pallidioribus "Pale Dull Gray," 4–5-plo latioribus; peritheciis monostichis, pyriformibus vel late ovoideis, 444–888 x 185–518 μ; sporidiis fuscis vel atro-fuscis, ellipsoideis vel subinaequilateraliter ellipsoideis, (9.6)–11.2–(14.4) x (4.8)–6.4–(8.) μ; conidiis solitariis vel verticillatis, hyalinis, elongato-ellipsoideis, 8–12.8 x 4.4 μ.

Stromata elongate-ellipsoidal or subglobose, substipitate or short-stipitate, usually single, occasionally confluent, minutely transversely sulcate above, "Snuff Brown," "Drab," or "Verona Brown," 5–15 x 14–15 x 9–13 mm.; sterile stipe zonate, black and shining. Ectostroma thin. Entostroma fibrous and partially collapsing, somewhat loculate, zonate, the thinner zones thin and black, the lighter zones 4–5 times broader, "Pale Dull Gray." Perithecia monostichous, subdistant, pyriform to broadly ovoid, 444–888 x 185–518 μ, the walls 29.6–37 μ thick. Ascospores fuscous to deep fuscous, ellipsoid to subinequilaterally ellipsoid, (9.6)–11.2–(14.4) x (4.8)–6.4–(8) μ. Conidia solitary or in whorls, hyaline, elongate-ellipsoid, 8–12.8 x 4.4 μ.

On wood of deciduous trees. Ohio, Illinois, and Missouri.

This species is close to *D. vernicosa* but differs from it by the usually smaller ascocarps, which are brownish rather than purplish and in young material are somewhat transversely rugose. The stipe, also, is more conspicuously annulate from the internal concentric zones. Physiologically this species, previously known as *Daldinia X*, is also distinct, as has been reported by the writer.[33]

Specimens examined:

UNITED STATES:

Ohio: Cincinnati, Sept. 22, 1920, *C. G. Lloyd* (L 11758).

Illinois: Evanston, Sept. 29, 1928, *H. Fox* (Po 229e).

Missouri: Valley Park, Sept. 1929, *D. H. Linder*, TYPE (Li, MBG); Dixon, Aug. 1929, *Marion Child* (MBG).

11. **Daldinia albozonata** Lloyd, Myc. Writings 5: 822. *fig. 1374*. March, 1919; *ibid.* 25. *fig. 1456*. July, 1919 (char. emend.).

Pl. 27, fig. 3; pl. 31, fig. 3.

Stromata mutua pressione irregulariter turbinata, dense caespitosa, subito in stipites crassos attenuata, .5–2 x 1–2 x .5–3 cm.; ectostromatibus "Dark Vinaceous Drab," "Dusky Drab," deinde "Anthracene Purple" vel atris, numquam fulgidis; stipitibus manifesto zonatis, longitudinaliterque rugosis, nemorosis; entostromatibus contextis vel fibrosis, persistentibus, non collabascentibus, manifesto zonatis, zonis obscurioribus "Bone Brown," fibrosis, zonis pallidioribus "Tilleul White," 4–5 plo latioribus; peritheciis late claviformibus, ad bases attenuatis, non dense

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[33] Child, M. Ann. Mo. Bot. Gard. 16: 411–486. 1929.

aggregatis, in totis peripheris stromatum, 148–370 x 370–740 μ; ostiolis prominentibus; ascis non persistentibus; sporidiis dilute fuscis, cymbiformibus, (6.4)–8–(9.6) x (2.4)–3.2–(4.8) μ.

Stromata irregularly turbinate by mutual pressure, densely cespitose, substipitate, .5–2 x 1–2 x .5–3 cm. Ectostroma "Dark Vinaceous Drab" to "Dusky Drab," finally "Anthracene Purple" to dull black or bronze-black, never shining; the stipe conspicuously zonate and longitudinally rugose, woody. Entostroma pithy, fibrous, persistent, conspicuously zonate, the lighter zones "Tilleul White" and 4–5 times broader than the darker "Bone Brown" zones. Perithecia borne over the entire stroma, broadly claviform, long-tapering at the base, subdistant, 148–370 x 370–740 μ, the walls 37 μ thick; ostioles prominent. Ascospores navicular, light fuscous, (6.4)–8–(9.6) x (2.4)–3.2–(4.8) μ.

The material upon which Lloyd based the species was sent from the Cameroons in Africa. As he remarks, it does suggest *D. vernicosa* because of the white inner context, which is firm, and a dull rather than a shining ectostroma. According to Lloyd, the ascospores measure 4 x 8 μ, but the writer has found them to be somewhat more variable and, for the most part, narrower.

Specimens examined:

AFRICA:

French Equatorial Africa (Cameroons): *G. Zenker*, TYPE (L 12375).

Angola: *J. W. Gossweiler* (L 12395).

Uganda: Mevu (?), alt. 1900 m. (PDS); Magungo (?), alt. 1300 m., *Dr. O. Mattiook, Balbo* (PDS).

12. **Daldinia cuprea** Starbäck, Kongl. Svensk Vet.-Akad. Handl. III. **27**^{9}: 5. *fig. 2*. 1901.

Daldinia granulosa Spegazzini, Anal. Mus. Nac. Buenos Aires III. **12**: 345. 1909.

Pl. 27, fig. 1; pl. 28, fig. 6; pl. 30, fig. 7; pl. 31, fig. 4.

Stromata narrowly clavate, solitary, the stipe differentiated from the fertile head, conspicuously annularly zoned and rugose, 1.2–1.7 x 1–1.5 x 5–6.6 cm. Ectostroma thin, at first "Seal Brown," "Sorghum Brown," becoming "Dark Vinaceous Brown," and

finally black and laccate. Entostroma conspicuously zonate, the lighter zones "Tilleul Buff," "Light Buff," "Cinnamon" to "Pinkish Buff," or "Mouse Gray," fibrous to pithy, collapsing and loculate, 3–4 times broader than the darker and more persistent "Bone Brown" zones. Perithecia confined to the head, monostichous, napiform, 740–888 x 444–518 μ; the wall 22.2–29.6 μ thick. Ostioles large, prominent, close together. Ascospores navicular, amber-colored, the ends acutely rounded, lighter-colored, and refractive, (8)–9.6–(11.2) x 4.8 μ.

On wood of deciduous trees. Paraguay and Argentina.

This species is characterized by the presence of papillate ostioles and by the fact that the stipe, conspicuously annulate exteriorly, is sharply separated from the perithecium-bearing upper portion of the stroma.

A comparison of the types of *D. cuprea* and *D. granulosa* shows conclusively that the two species are identical.

Specimens examined:

South America:

Paraguay: Paraguari, Cerro Negro, Aug. 8, 1893, *G. O. Malme*, TYPE (St 6).

Argentina: Rio Pescado, Jujuy, March 1905, *Spegazzini*, TYPE of *D. granulosa* (A).

Island of Ta (probably in Argentina): April 1, 1902, *R. E. Fries* (St 373), and April 10, 1902, *R. E. Fries* (St 425).

Locality unknown: March 22, 1902, *R. E. Fries* (St 337).

13. Daldinia clavata Hennings, Hedwigia **41**: 14. 1902.

Daldinia vernicosa var. *microspora* Starbäck, Kongl. Svensk Vet.-Akad. Handl. III. **27**^{9}: 6. 1901.

Daldinia barbata Rick, Broteria **5**: 50. 1906.

Daldinia argentinensis Spegazzini, Anal. Mus. Nac. Buenos Aires III. **1**: 68. 1902.

Daldinia argentinensis Speg. f. *sessilis* of authors in part, Anal. Mus. Nac. Buenos Aires III. **12**: 345. 1909.

Pl. 27, fig. 2; pl. 30, fig. 6; pl. 33, fig. 5.

Stromata cylindrical to broadly clavate, sessile or contracted below into a short somewhat rugose stipe, single, rarely confluent, laterally compressed, smooth or finely rugose, 1–6 x .9–4.5 x 1–5 cm. Ectostroma thin, brittle, at first "Hay's Brown" or "Dark Vinaceous Brown," finally dull to shiny black and laccate. Entostroma persistent, definitely zonate, the lighter zones "Tilleul Buff," "Hair Brown," "Drab Gray," or "Vinaceous Buff," fibrous to pithy and 4–5 times broader than the darker and more compact "Bone Brown" zones. Perithecia monostichous or polystichous, claviform, borne over almost the entire stroma, 740–1086 x 236–370 μ; the walls 22.2–29.6 μ thick. Ostioles distant, obsolete to punctiform. Ascospores amber-colored, navicular to subinequilaterally ellipsoid, ends acutely rounded, lighter colored, and refractive, (8)–9.6–(12.8) x (3.2)–4.8–(6.4) μ.

On wood of deciduous trees. Mexico, Guatemala, Brazil, and Argentina.

The obsolete ostioles and the conspicuously collapsing tissue of the entostroma separate this species from *D. cuprea*. It is further differentiated by the fact that the fertile portion of the fruiting body is not clearly distinguishable from the short stipe.

Specimens examined:

MEXICO: Vera Cruz, on trees, Dec. 1907, *C. A. Purpus* (L 12390); Mexico City, *S. Bonansea* (L 12391).

CENTRAL AMERICA:

Guatemala: *T. J. Collins* (L 12380); *Silas L. Schumo* (L 12397).

SOUTH AMERICA:

Brazil: Matto Grosso, Guia, May 13, 1894, *G. O. Malme*, authentic material of *D. vernicosa* var. *microspora* (St); Rio Grande do Sul, Lagedo, *Rick* (L 12304, 12393), 1921, *Rick* (PDS 19805); Rio Grande do Sul, 1904, *Theissen* (F) probably authentic; St. Catharina Island, Blumenau, 1892, *A. Möller*, TYPE (B).

Argentina: Missiones, Puerto Pampa, Jan. 1901, *E. Kermes*, TYPE of *D. argentinensis* (A); Jujuy, Rio Pescado, on dead trees, March 1905, *Spegazzini*, TYPE of *D. argentinensis* f. *sessilis* (2) (A).[34]

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[34] The number in the bracket was used by the author in order to separate Spegazzini's mixed collection, which bore no number. The original packet contained a mixed collection and the author has separated the specimens accordingly: No. 1, *D. Eschscholzii;* No. 2, *D. clavata;* No. 3, *Hypoxylon* sp.

DOUBTFUL OR EXCLUDED SPECIES

Daldinia angolensis (Welw. & Curr.) Sacc. Syll. Fung. **1**: 394. 1882.

Hypoxylon angolense Welw. & Curr. Trans. Linn. Soc. Bot. **26**: 282. 1868.

The writer has been unable to examine the type material of this species, although she has studied specimens in the Lloyd Herbarium that pass under this name. In none of these, zonation is evident, hence the species should probably be placed in *Hypoxylon* in accordance with Welwitsch and Currey.[35] However, since the species has been placed in *Rhopalopsis, Kretzschmaria*, and *Camillea*, the writer feels that it is inadvisable to make a definite disposition of the species.

Daldinia aspera Massee, Kew Bull. Misc. Inf. **1898**: 134. 1898.

There is no evidence of definite zonation in the type material of this species. It probably should be considered a large tropical species of *Hypoxylon*, either close to or synonymous with *H. cerebrinum* Fée.

Daldinia asphalatum (Link) Sacc. Syll. Fung. **1**: 394. 1882.

Sphaeria asphalatum Link et Fries, Linnaea **5**: 540. 1830.

The entostroma of the type of this species is homogeneous. The writer has found this species under *D. Eschscholzii, D. occidentale*, and *D. Gollani*. It is probably a species of *Hypoxylon*.

Daldinia durissima (Schw.) Sacc. Syll. Fung. **1**: 394. 1882.

Sphaeria durissima Schw. Syn. Fung. Car. Suppl. 32. 1822.

This species is doubtfully *D. concentrica*. A photograph of the type was available for study (pl. 30, fig. 1), as was also a preparation of the ascospores. From a photograph it was impossible to see any evidence of zonation in the entostroma. The spores, however, are of the same size as those of *D. concentrica*. According to Cooke,[36] this is a synonym of *Hypoxylon marginatum*.

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[35] Welwitsch, F. & F. Currey. Trans. Linn. Soc. Bot. **26**: 282. 1868.

[36] Cooke, M. C. Grevillea **11**: 121–140. 1883.

Daldinia exsurgens (Mont.) Rehm, Ann. Myc. **7**: 4. 1909.
Hypoxylon exsurgens Mont.-Guy. Syll. Gen. Spec. Crypt. 213. 1856.

This species was placed in *Daldinia* because of the very faint zones present in the entostroma. The type material, although showing the faint zones, appears to be referable to *Hypoxylon* near *H. herculeum*.

Daldinia Feei Sacc. Syll. Fung. **1**: 395. 1882.

This species was originally described by Fée[37] in *Sphaeria*, but from that genus it was transferred to *Daldinia* by Saccardo,[38] who, however, renamed it, since the name *D. vernicosa* was preëmpted. Later, Saccardo[39] with good reason transferred the species to *Xylaria* where it properly belongs. *D. Feei* is therefore synonymous with *Xylaria vernicosa* (Fée) Saccardo.

Daldinia placentiformis (B. & C.) Theissen, Ann. Myc. **7**: 4–5. 1909.
Hypoxylon (*Glebosae*) *placentiforme* Berk. & Curt. Fungi Cubensis, 383. 1867.

The homogeneous context of the authentic material seen by the writer excludes this species from *Daldinia*.

Daldinia stratosa Sacc. Syll. Fung. **22**: 327. 1913.
Hypoxylon stratosum Sacc. Syll. Fung. **9**: 544. 1891.
Ita nuncupandum a *D. Eschscholzii* (Ehrenbg.) Rehm, Sacc. Syll. Fung. **17**: 617. 1905.

The writer has seen no specimen of this species. Saccardo has called it a *D. Eschscholzii*.

Daldinia Thouarsiana (Lév.) Sacc. Syll. Fung. **1**: 395. 1882.
Sphaeria Thouarsiana Lév. Ann. Sci. Nat. Bot. III. **5**: 258. 1846.

The context of the type material is homogeneous. The species should be placed in *Hypoxylon*. It has been variously considered as either *H. Thouarsianum* or *H. malleolus*.

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[37] Fée, A. L. A. Nouv. Mém. Soc. Sci. Agr. et Arts du Dept. Bas Rhin 2^1: 143–146. *pl. 12, fig. 2.* 1834.

[38] Saccardo, P. A. Syll. Fung. **1**: 395. 1882.

[39] *Ibid.* **9**: 530. 1891.

Daldinia Warburgii Hennings, Fungi Warburg. Hedwigia **32**: 225. 1893.

The type material shows a homogeneous context. The ascospores are a very dark brown color and are extremely long and narrow. The material examined obviously belongs in *Hypoxylon.*

Explanation of Plate

PLATE 26

All photomicrographs were taken at a magnification of approximately × 815.

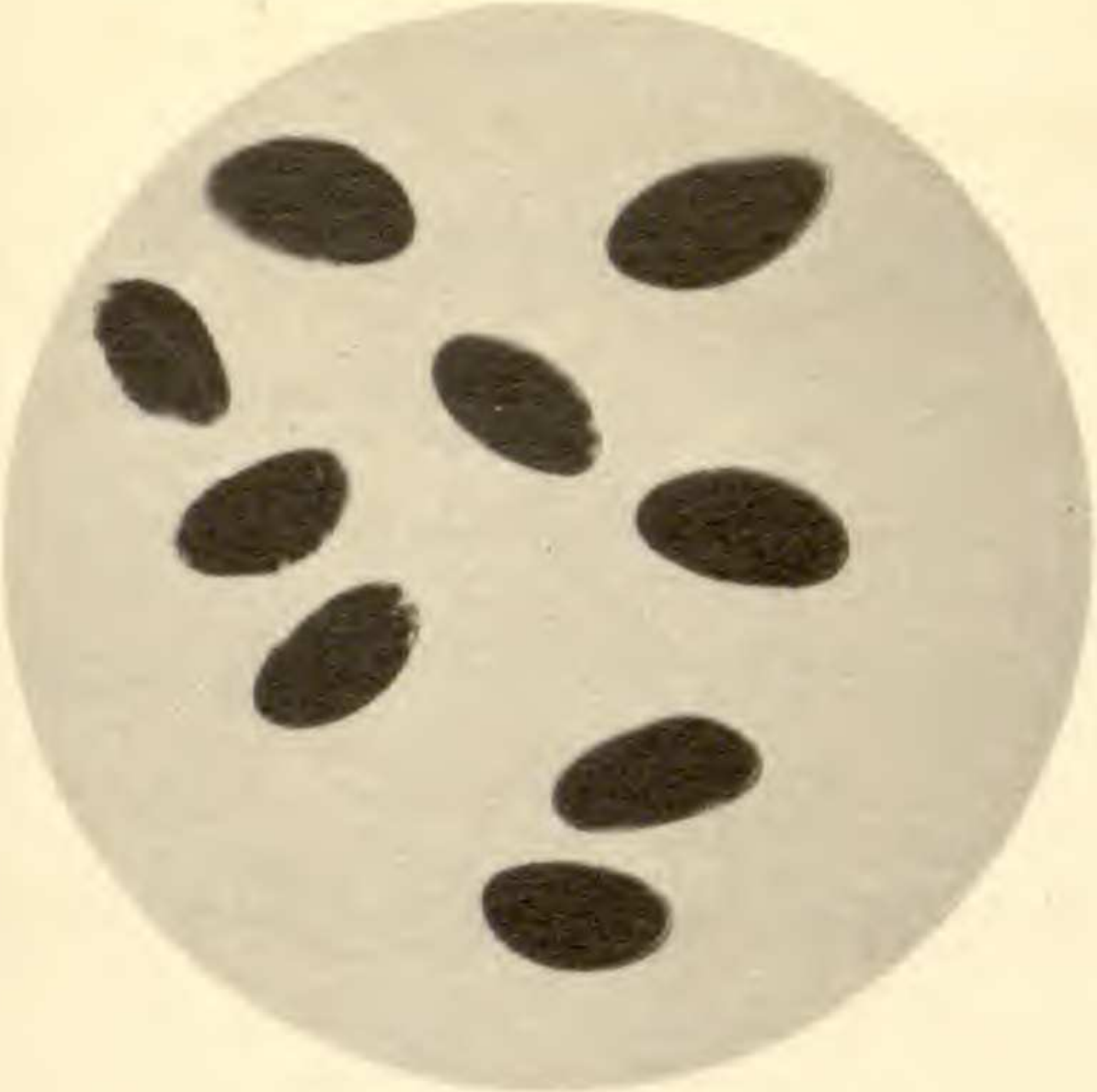
Fig. 1. *Daldinia vernicosa*, from material collected in Missouri (Li).

Fig. 2. *Daldinia simulans*, from type material.

Figs. 3–4. *Daldinia loculata.*

Fig. 5. *Daldinia Eschscholzii*, from material collected in the Bahamas, by A. D. Machado (L 12385).

Figs. 6–7. *Daldinia caldariorum*, from type material.



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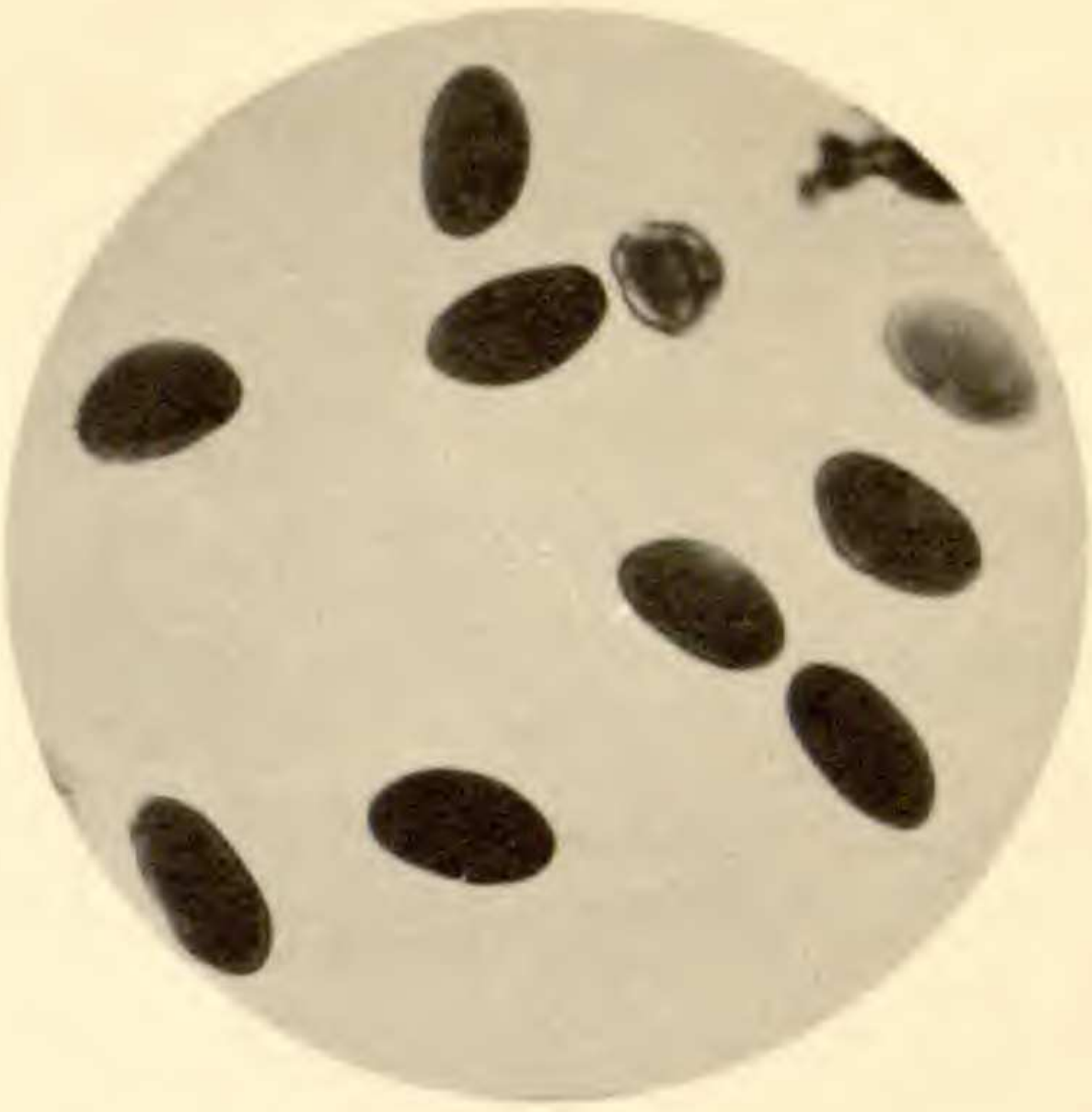

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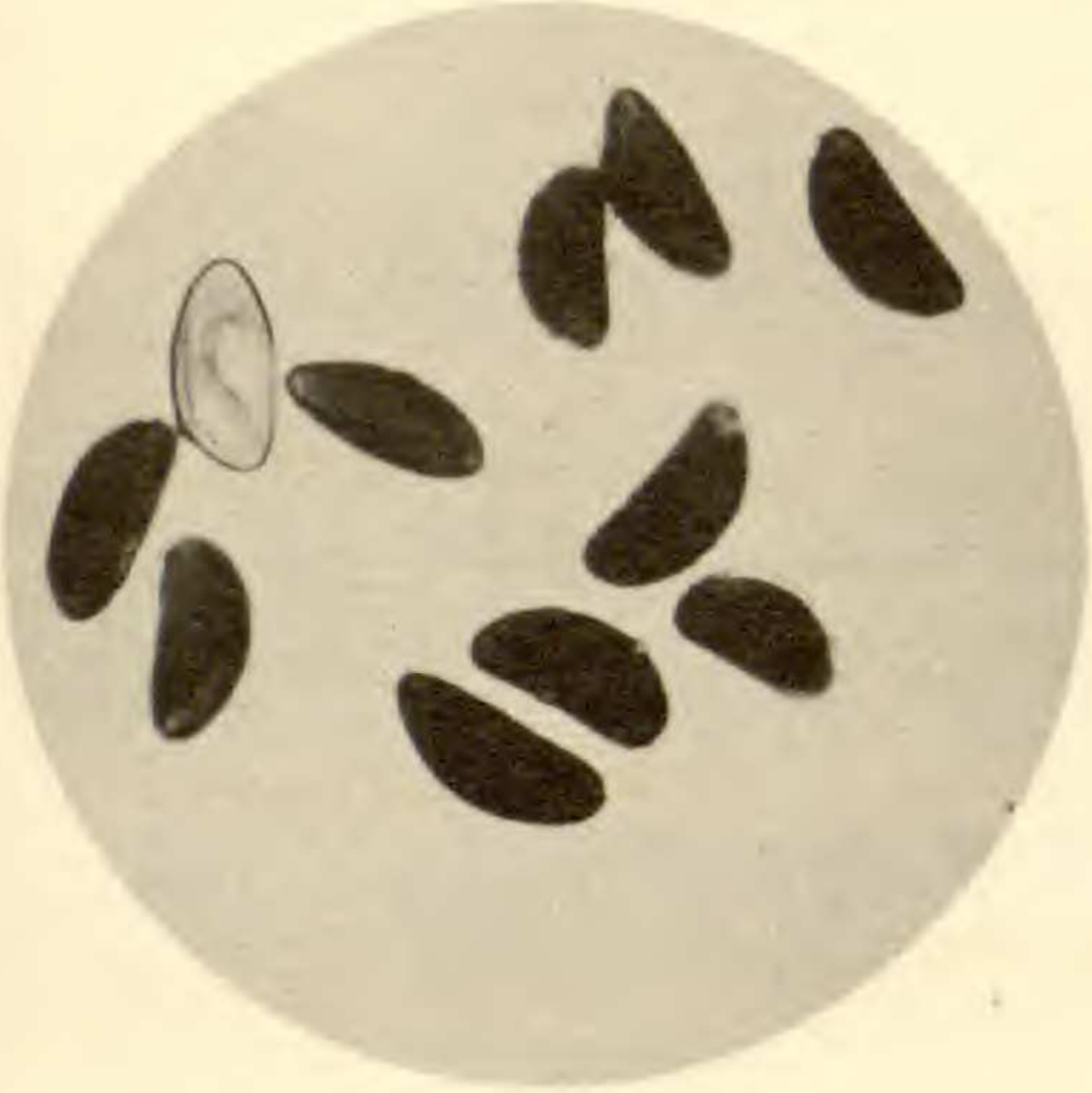

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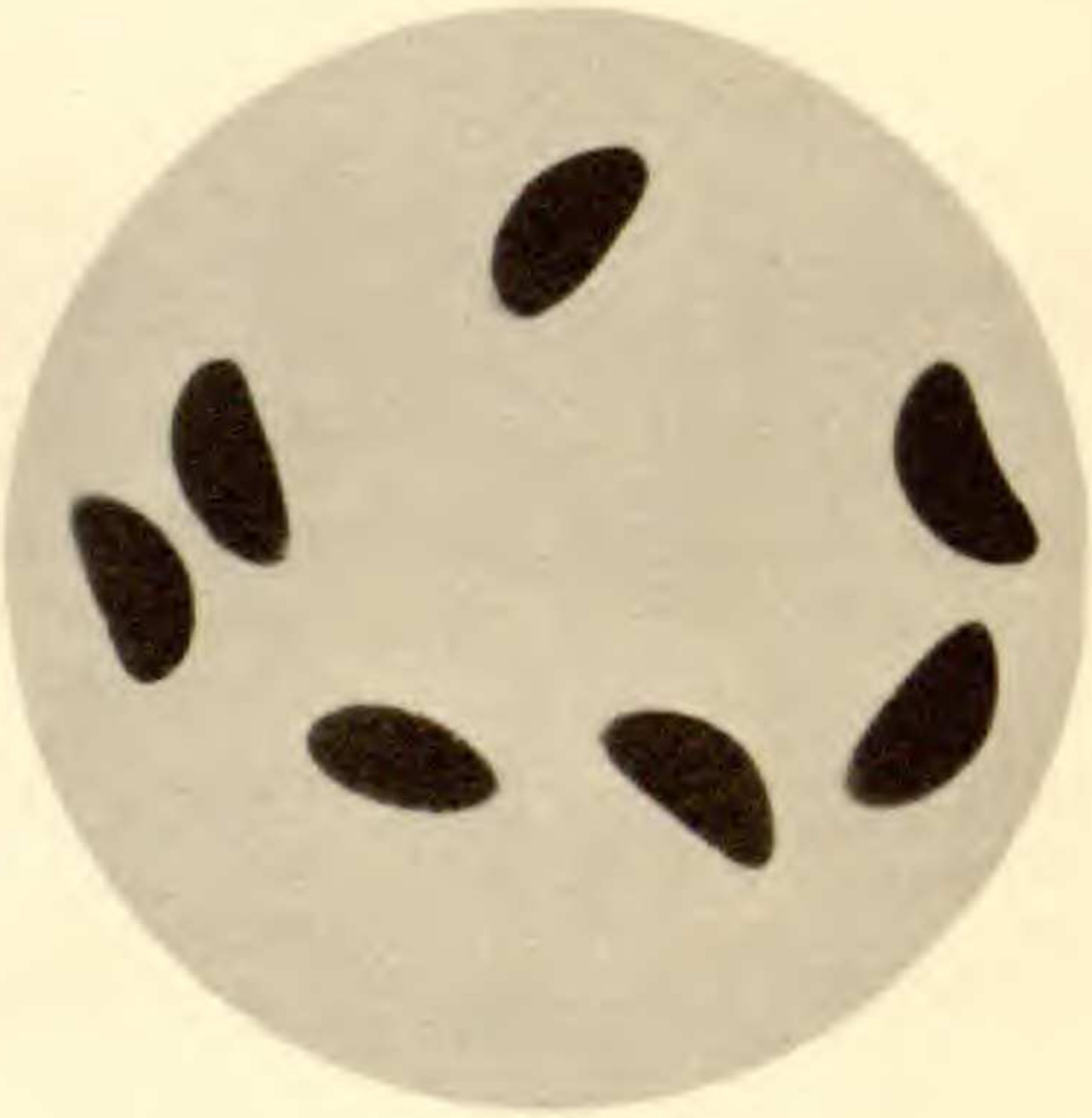

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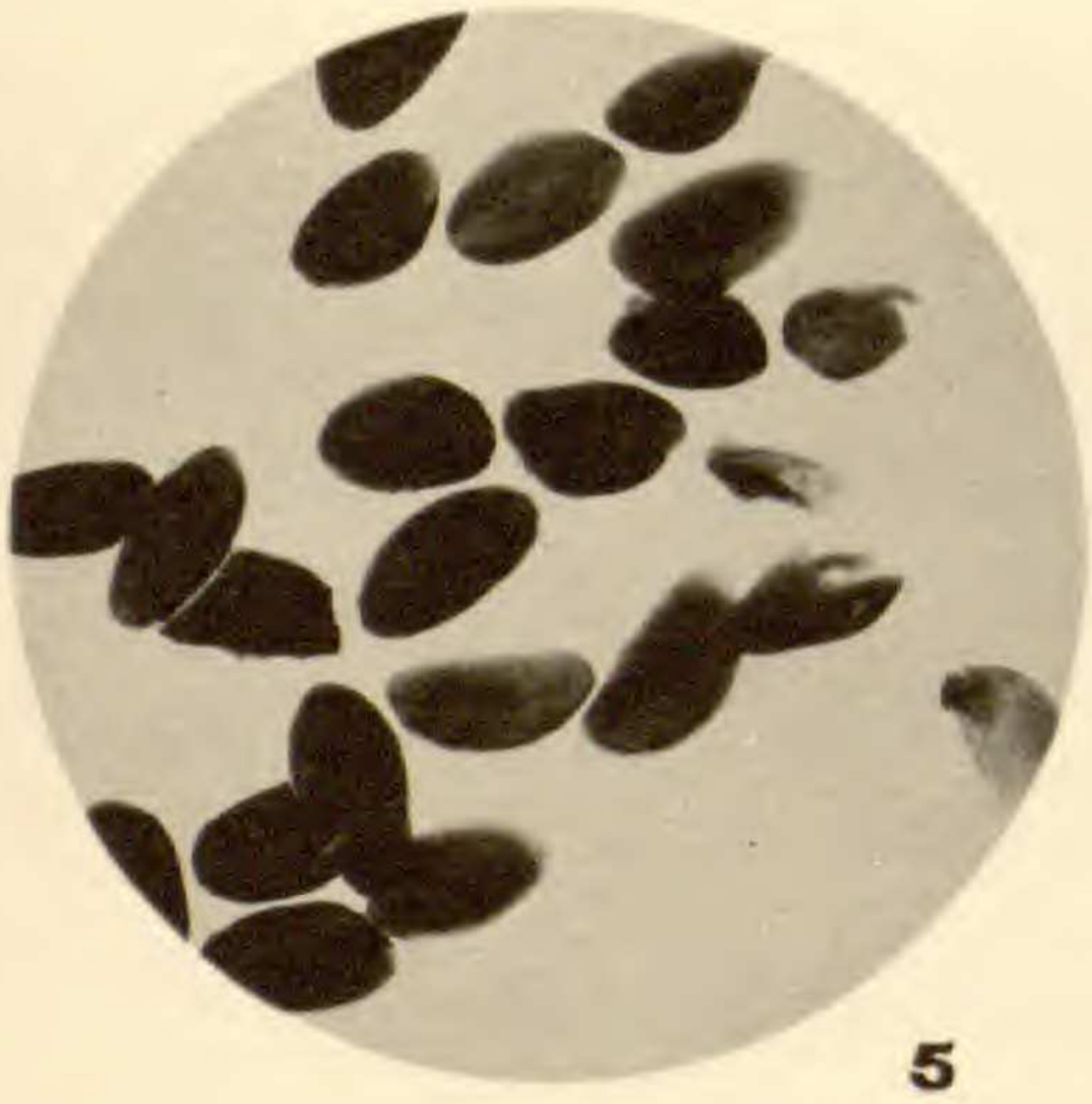

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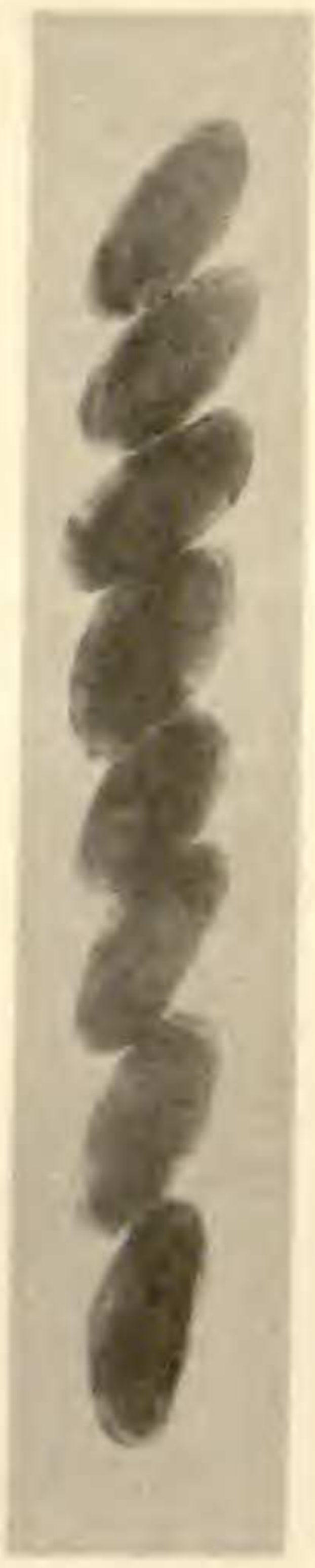

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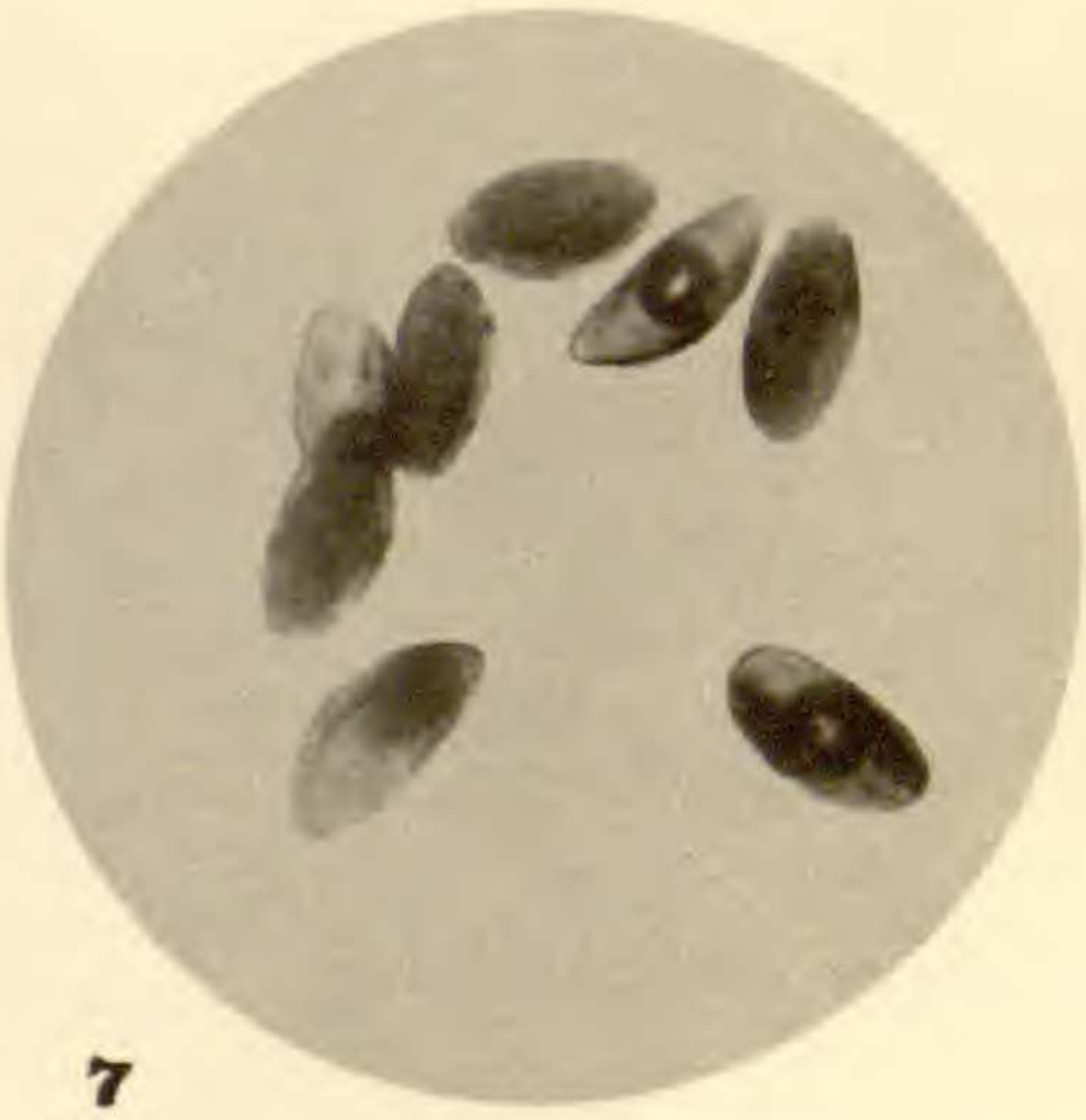


7

CHILD—THE GENUS DALDINIA

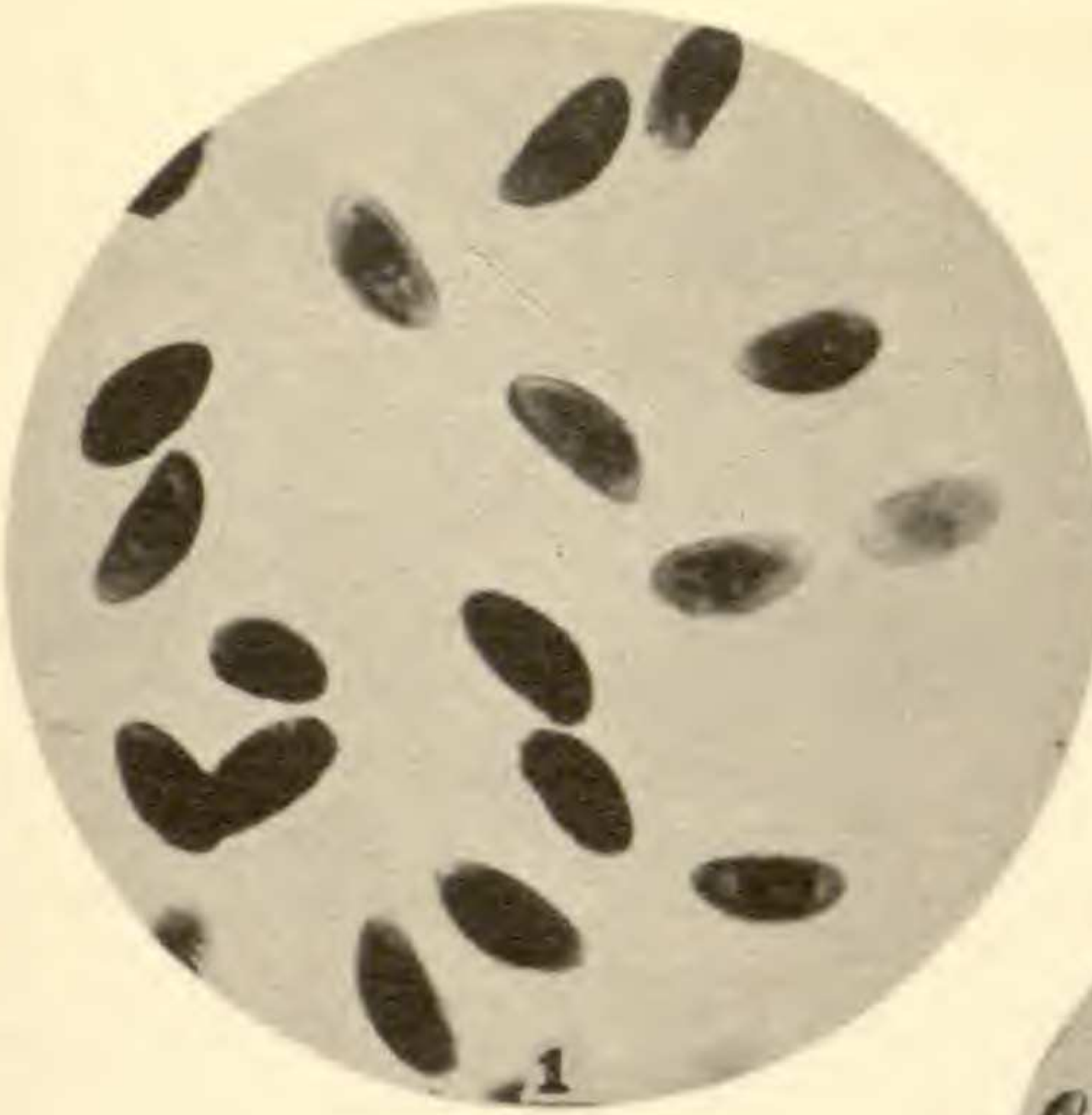
COCKAYNE, BOSTON

Explanation of Plate

PLATE 27

All photomicrographs were taken at a magnification of approximately × 815.

Fig. 1. *Daldinia cuprea*, from type material.
Fig. 2. *Daldinia clavata.*
Fig. 3. *Daldinia albozonata*, from type material.
Fig. 4. *Daldinia concentrica*, from material collected in Missouri by P. Spaulding.
Fig. 5. *Daldinia Eschscholzii.*
Fig. 6. *Daldinia occidentale*, from type material.
Fig. 7. *Daldinia Gollani*, from type material.
Fig. 8. *Daldinia grande*, from type material.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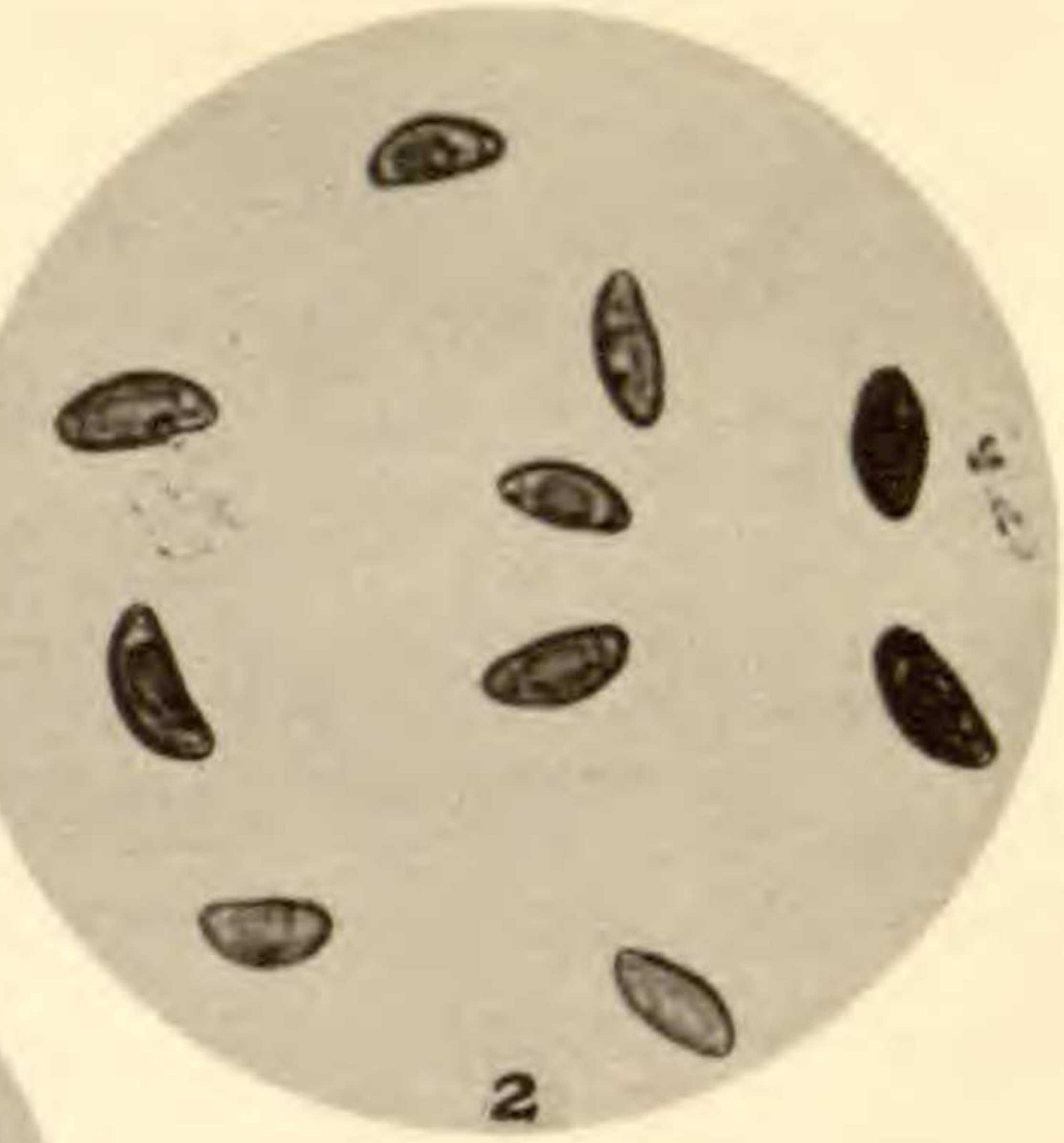
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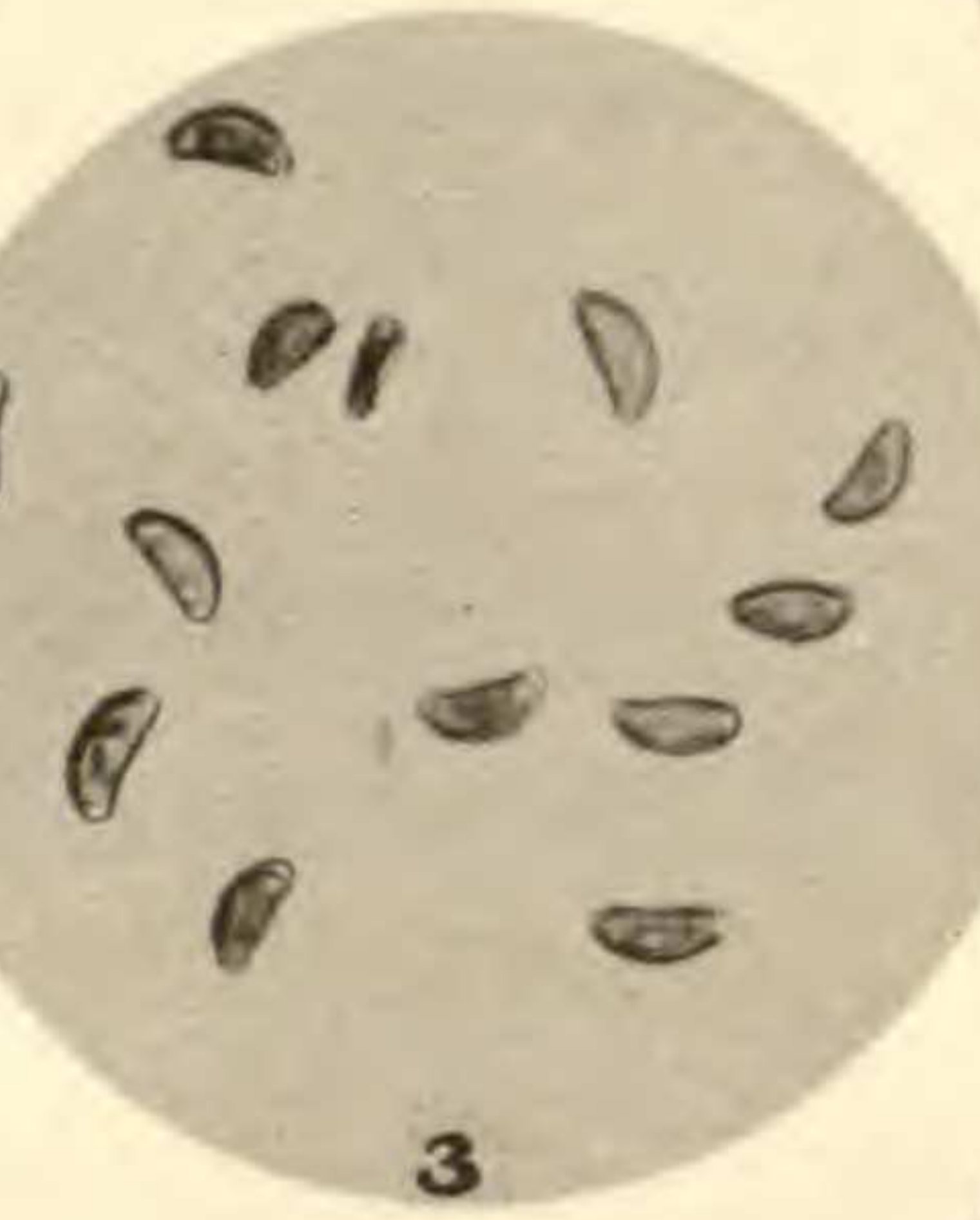
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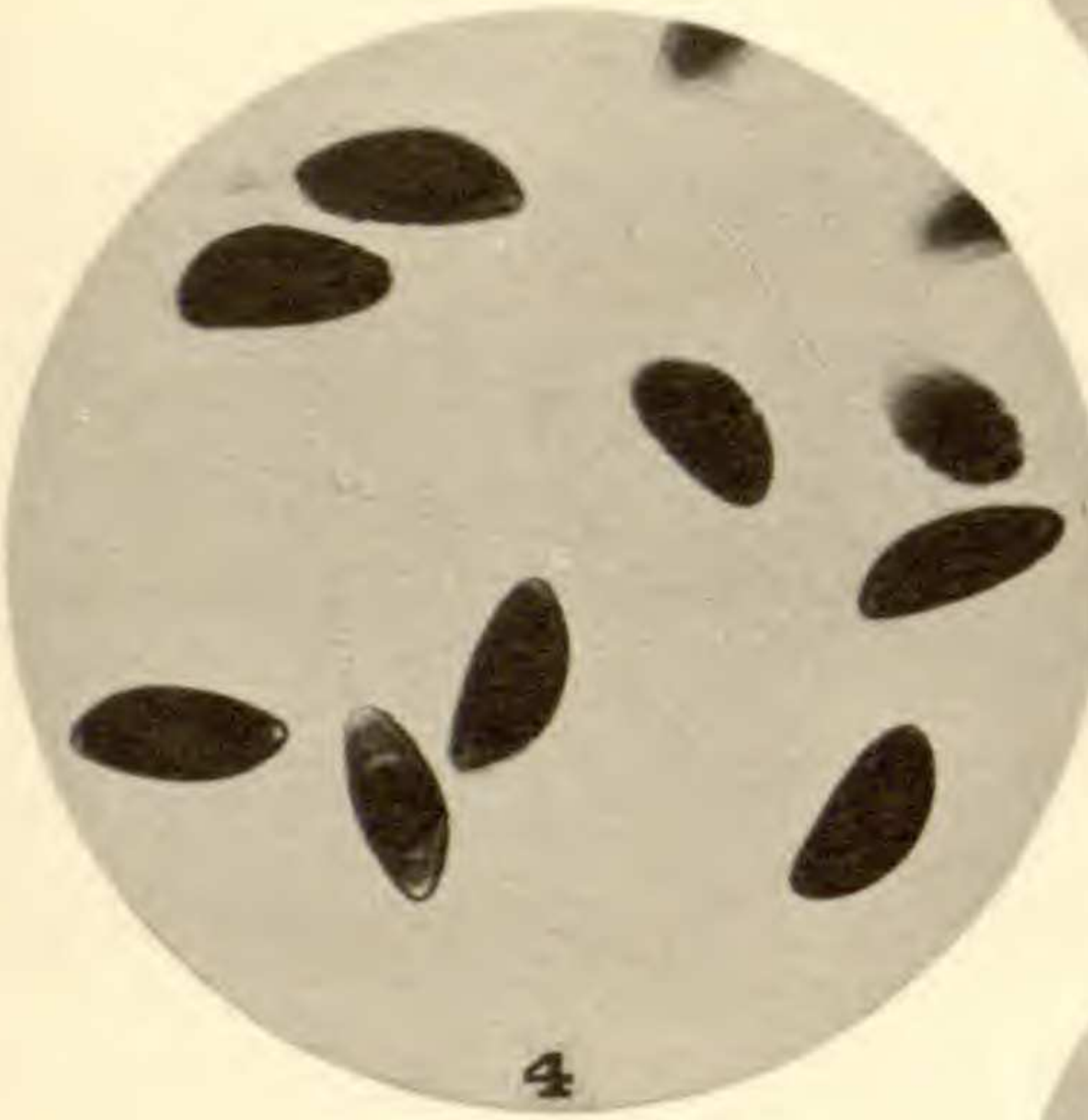
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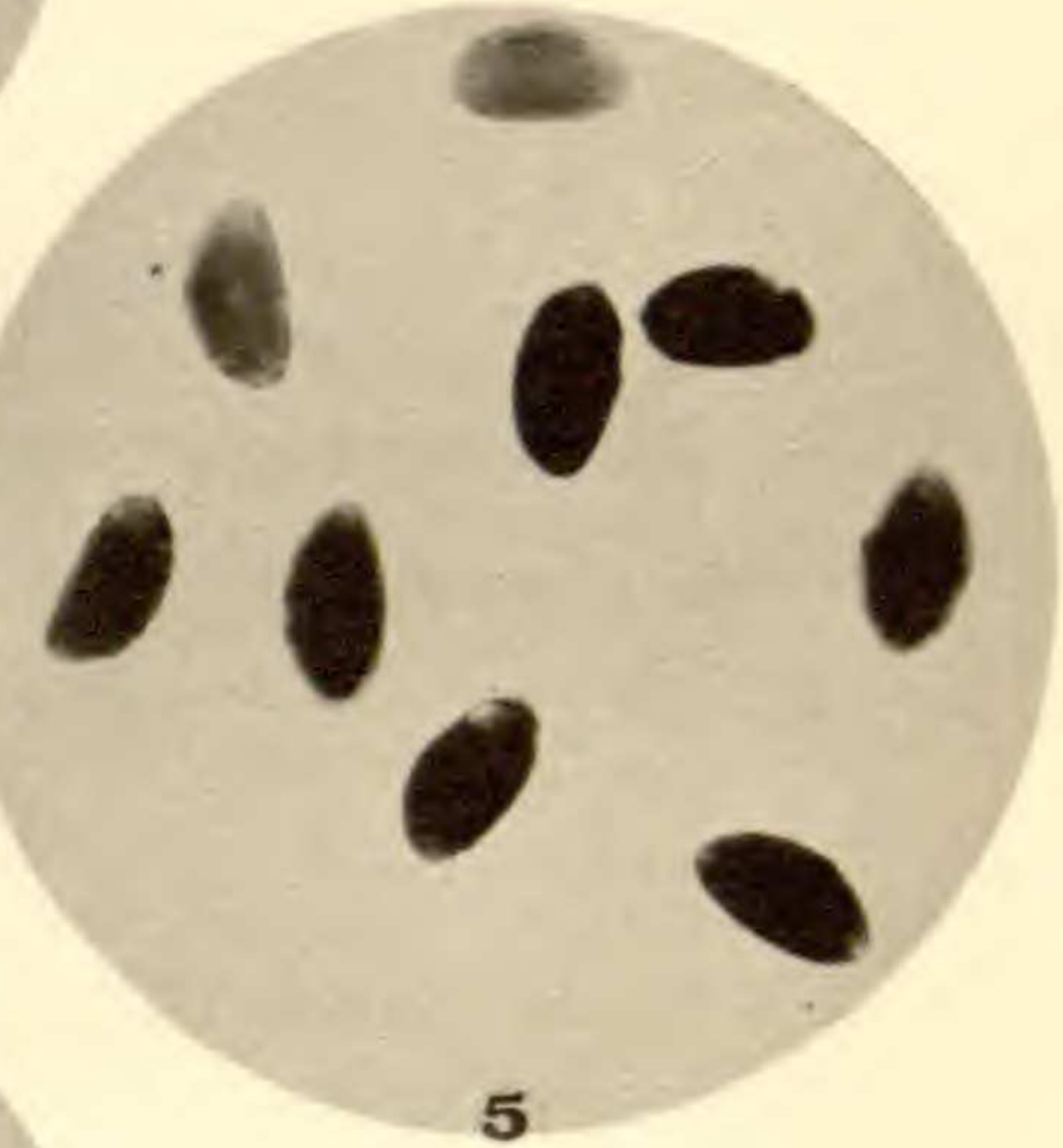
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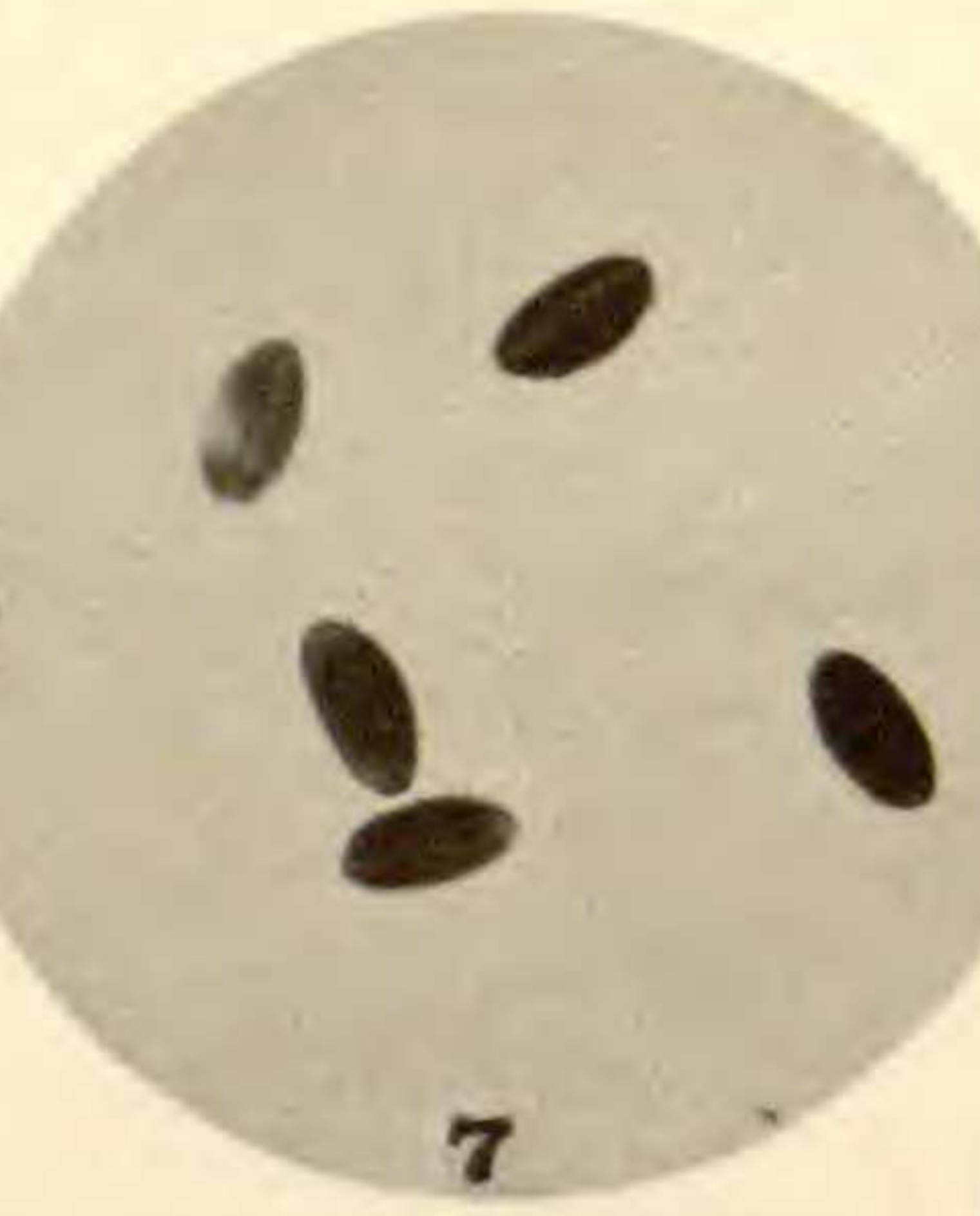
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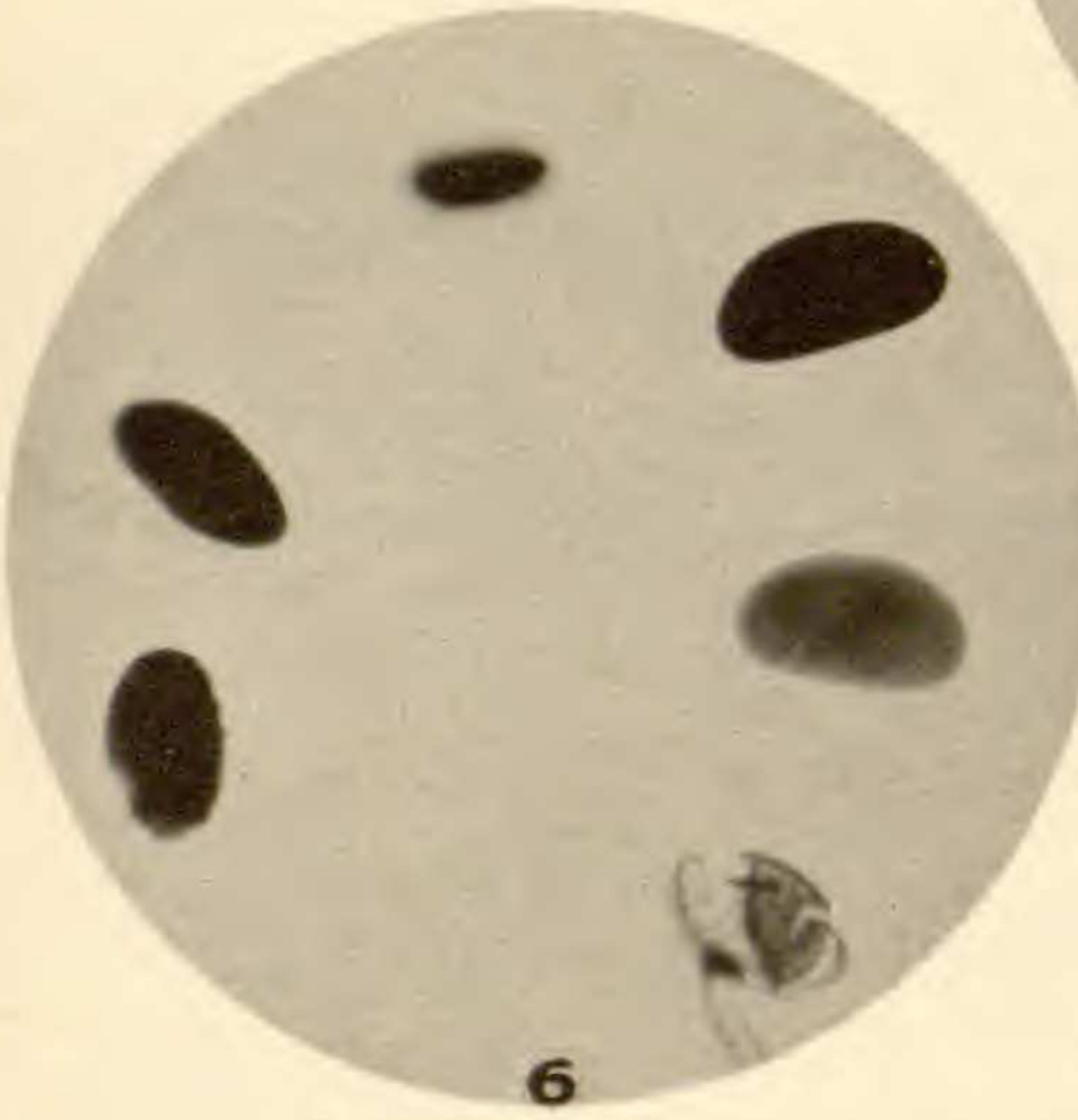
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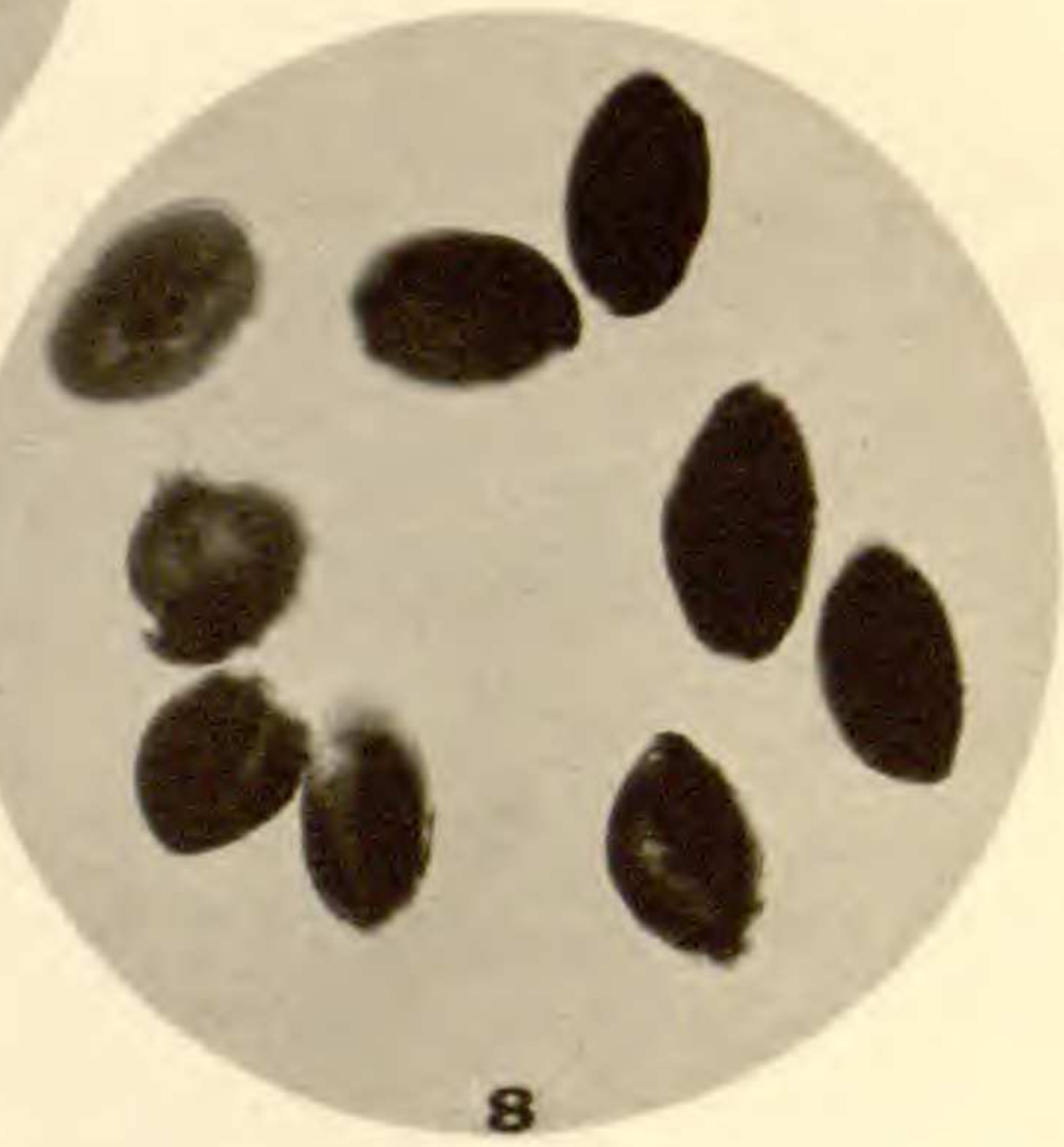
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Explanation of Plate

PLATE 28

The photomicrographs were all taken at a magnification of × 13.

Fig. 1. *Daldinia vernicosa.* Note the shining surface and the well-spaced ostioles.

Fig. 2. *Daldinia simulans.* In this species, especially in material that is not quite mature, the surface is characteristically wrinkled, and the ostioles are inconspicuous.

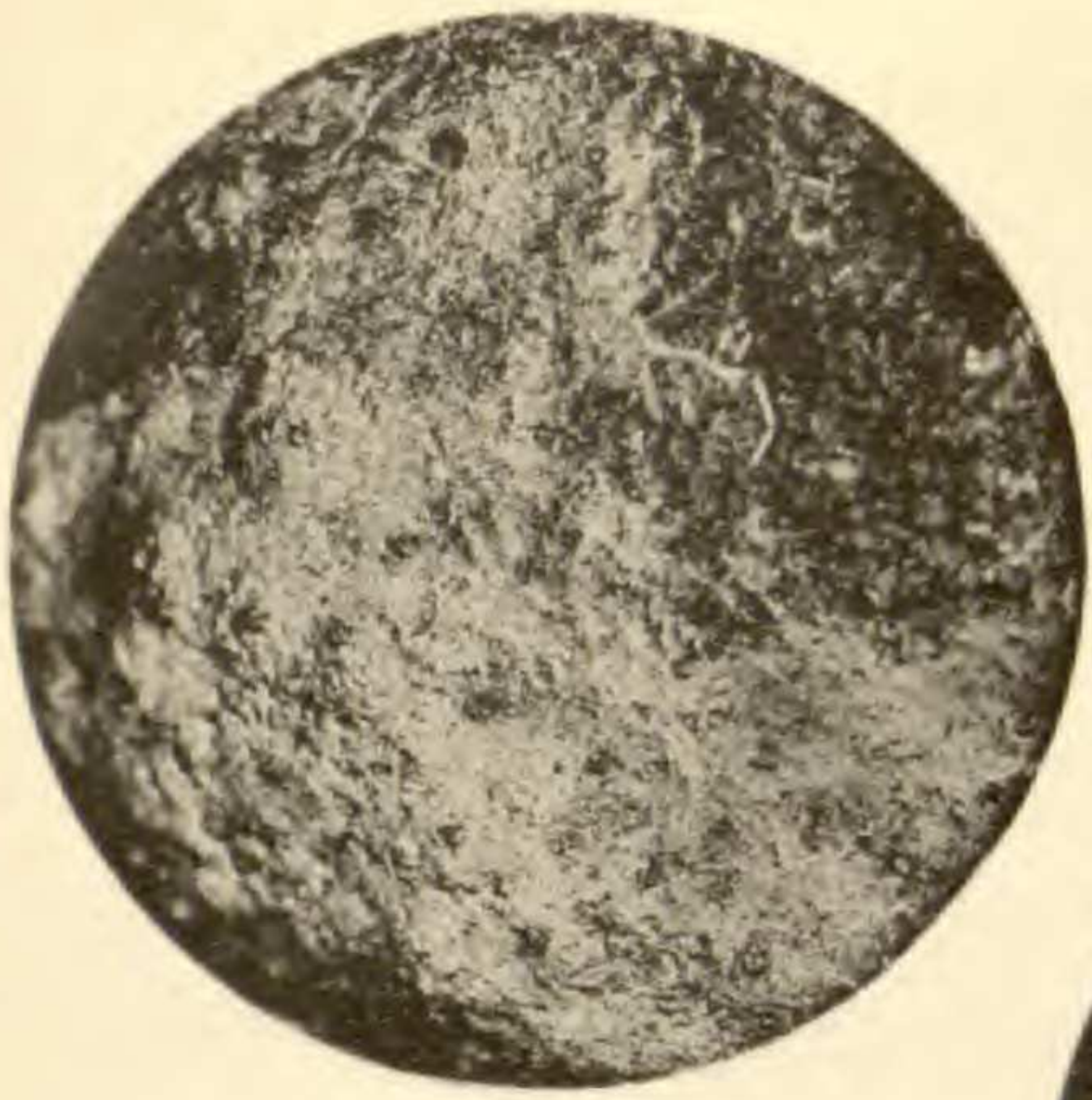
Fig. 3. *Daldinia occidentale.* The ectostroma is papillate around the ostioles, but the mouths of the ostioles are not pronounced.

Fig. 4. *Daldinia concentrica.* In this specimen the ostioles are not pronounced.

Fig. 5. *Daldinia Eschscholzii.* The ostioles in material that has not been rubbed or weathered are conspicuous as black dots.

Fig. 6. *Daldinia cuprea.* The ostioles are prominent and extend beyond the papillate ectostroma.

Figs. 7–8. *Daldinia grande.* The *Rosellinia*-like ostioles shown in fig. 8 are from the same fruiting body as are the smaller ones shown in fig. 7.



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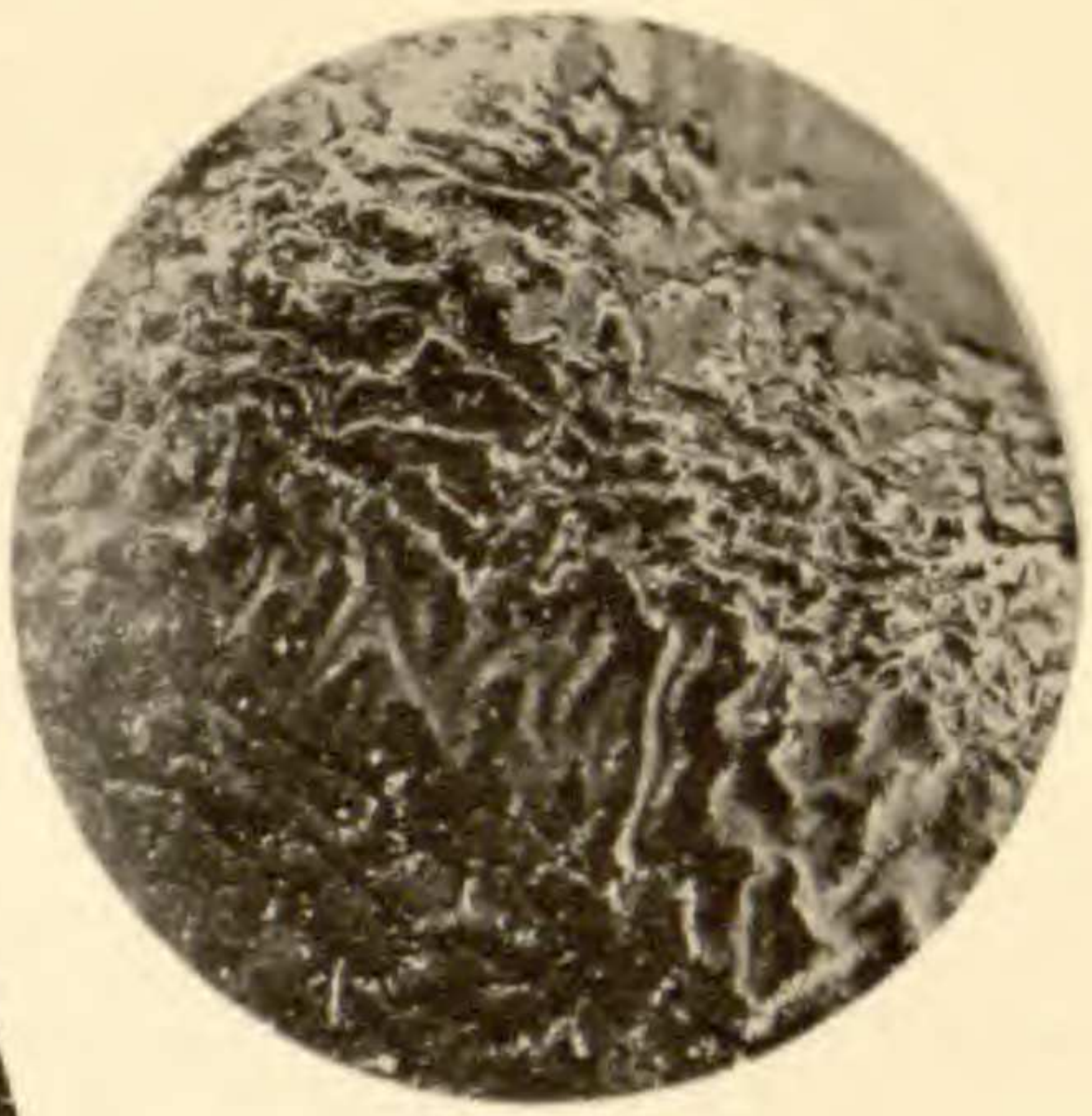

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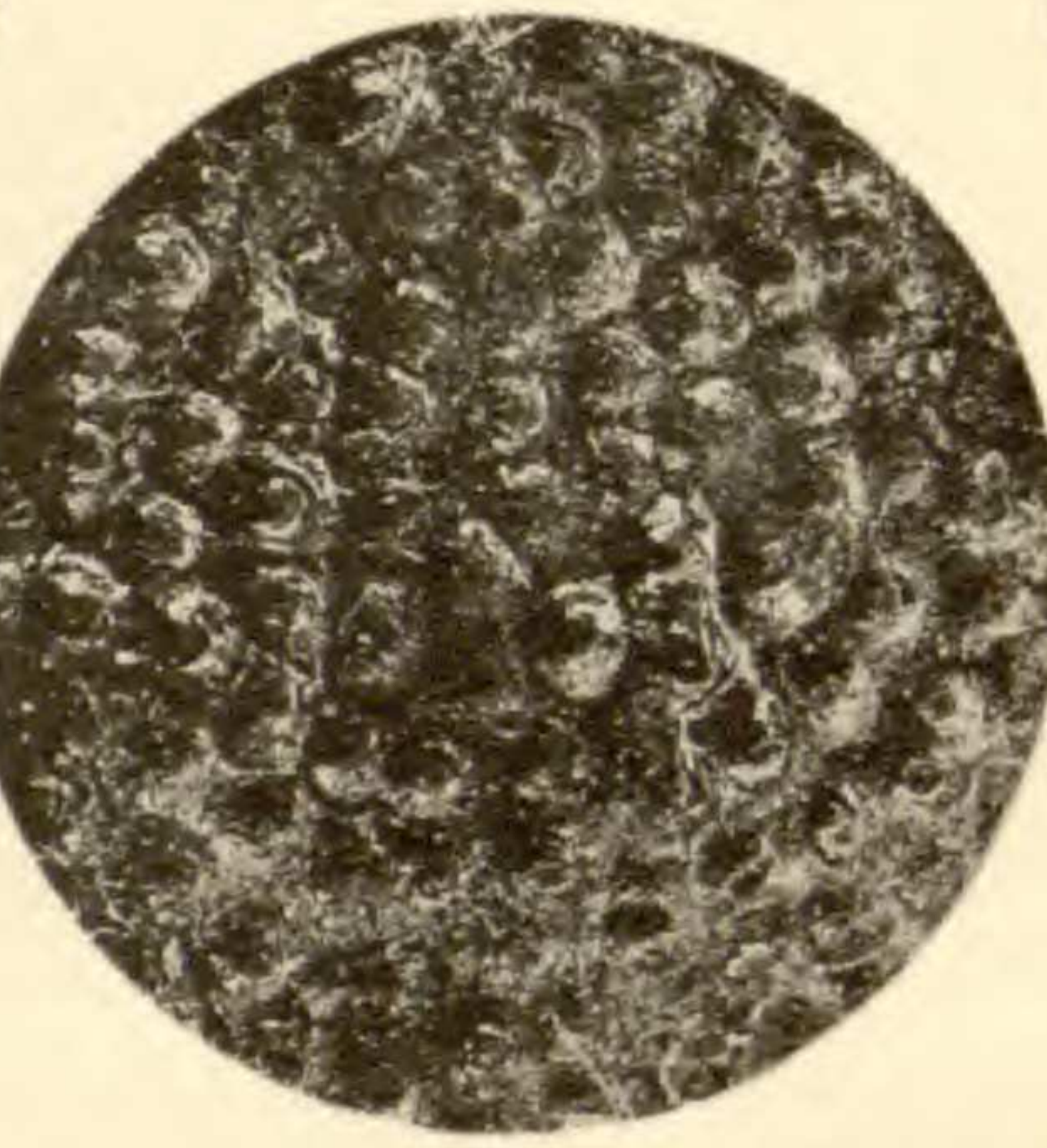

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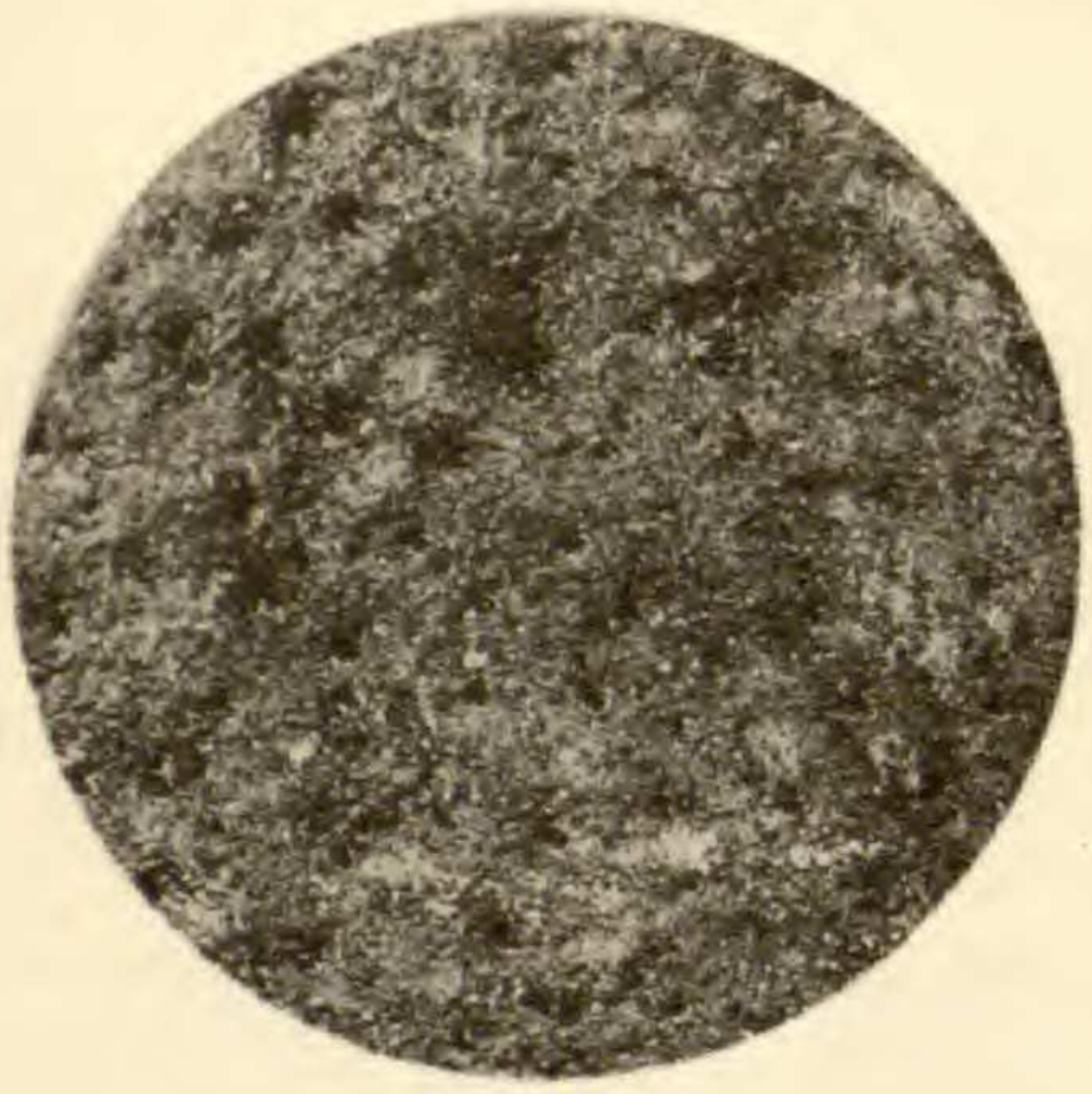

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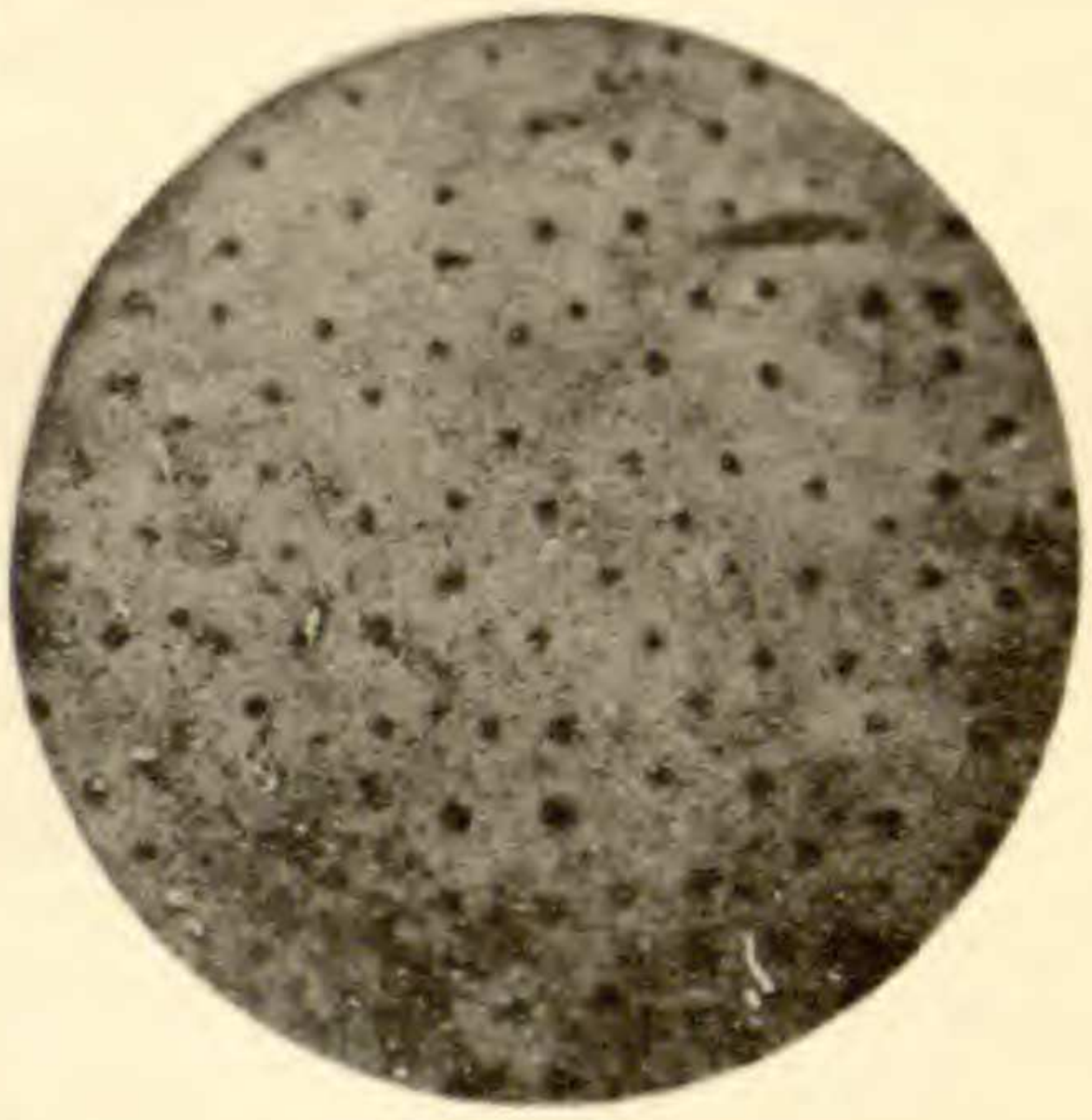

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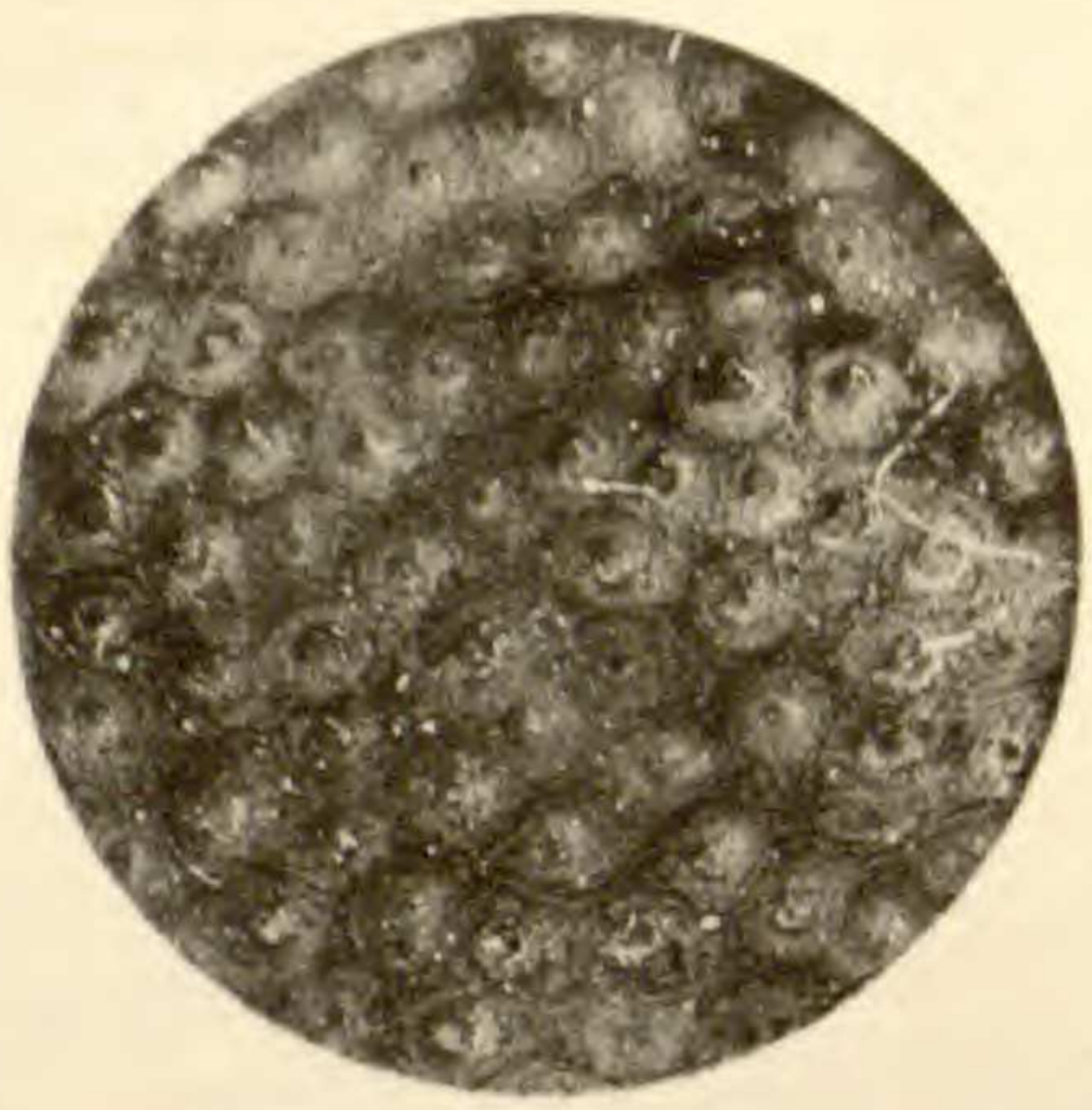

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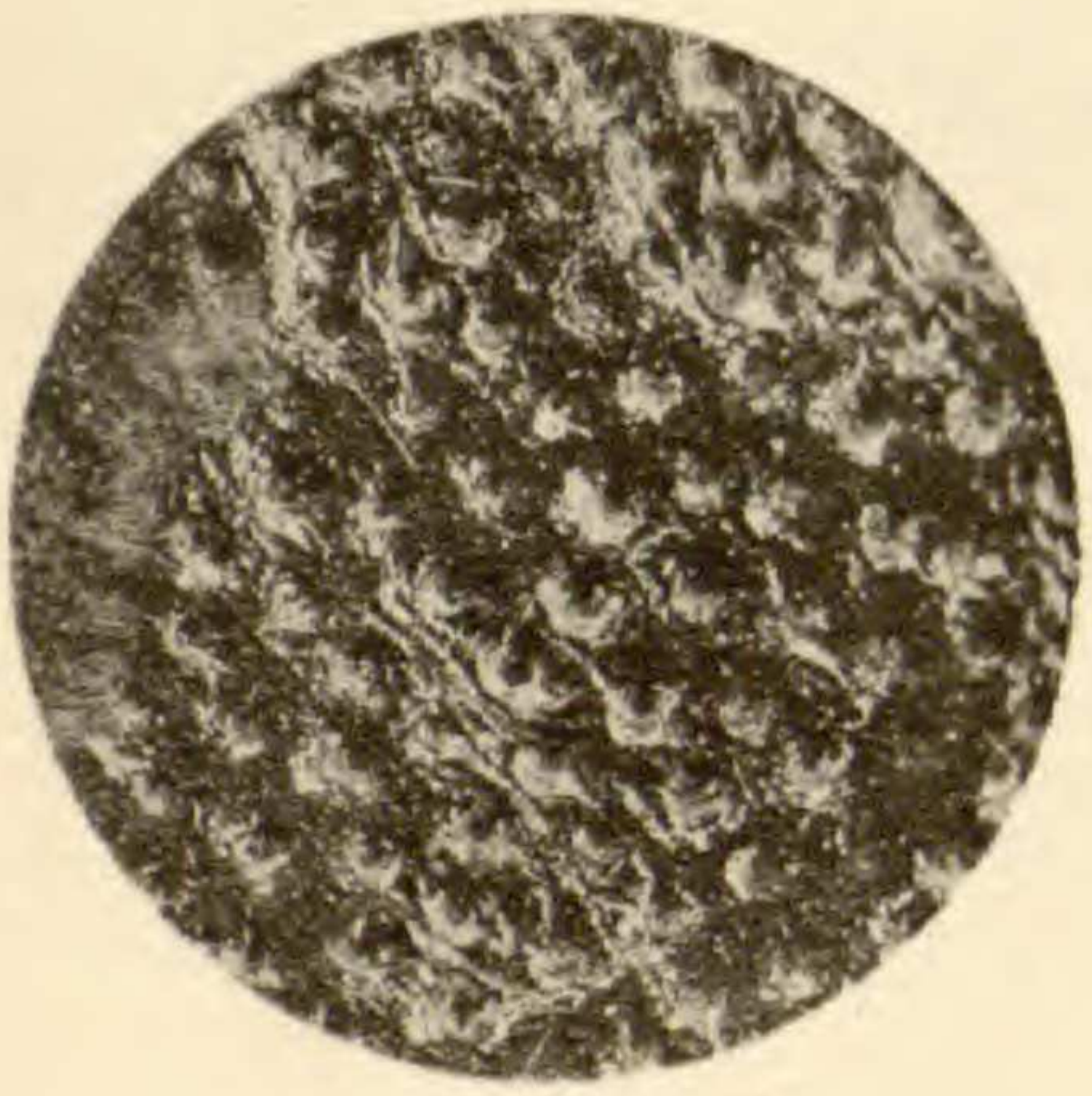

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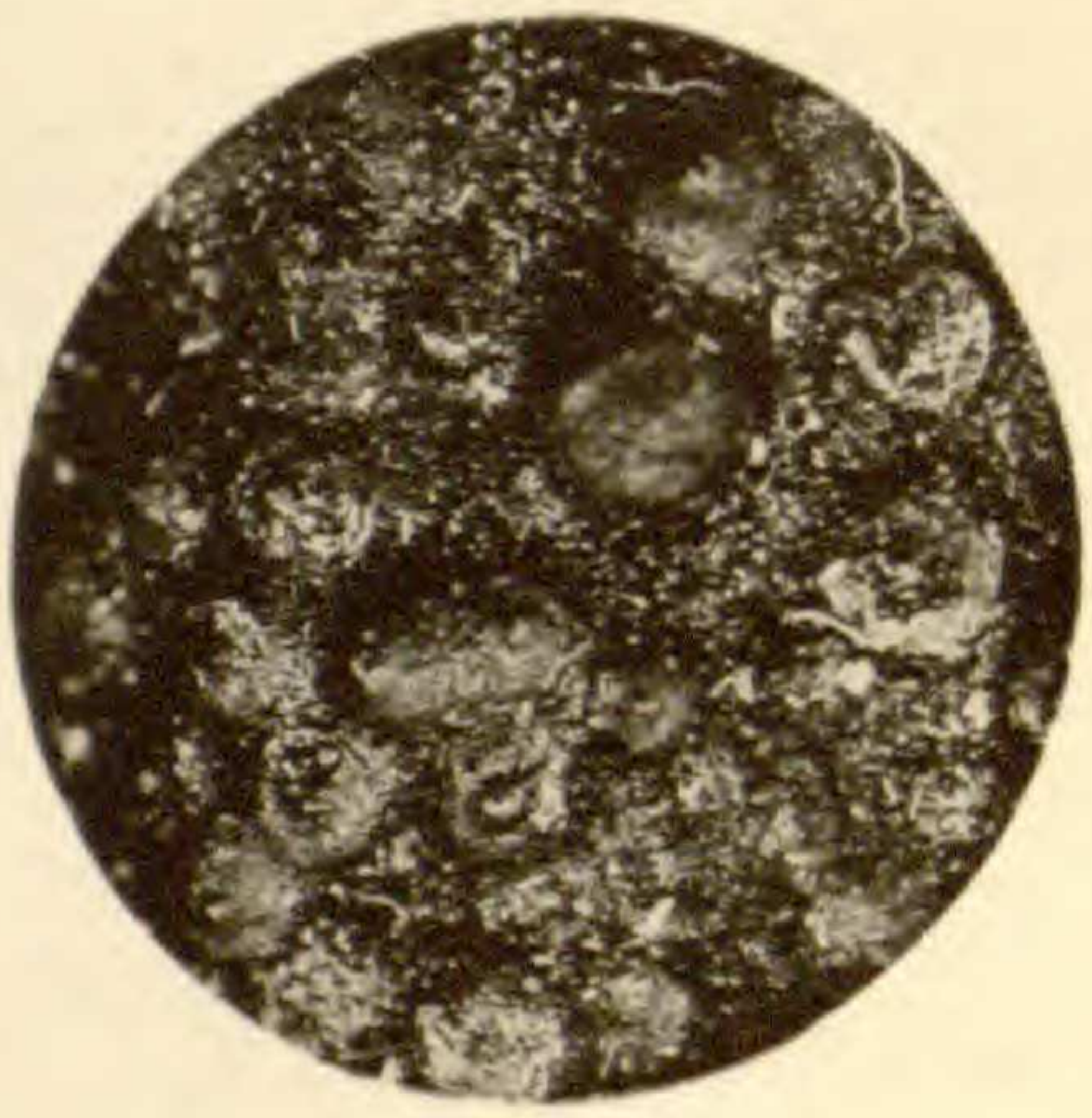


8

CHILD—THE GENUS DALDINIA

Explanation of Plate

PLATE 29

The scale accompanying each figure equals 1 centimeter.

Fig. 1. *Daldinia concentrica*, from Jugo-Slavia (St).

Fig. 2. *Daldinia concentrica*, from Germany (St). Note the rather prominent ostioles.

Fig. 3. *Daldinia Eschscholzii*, from Burma (St 1120).

Fig. 4. *Daldinia concentrica*.

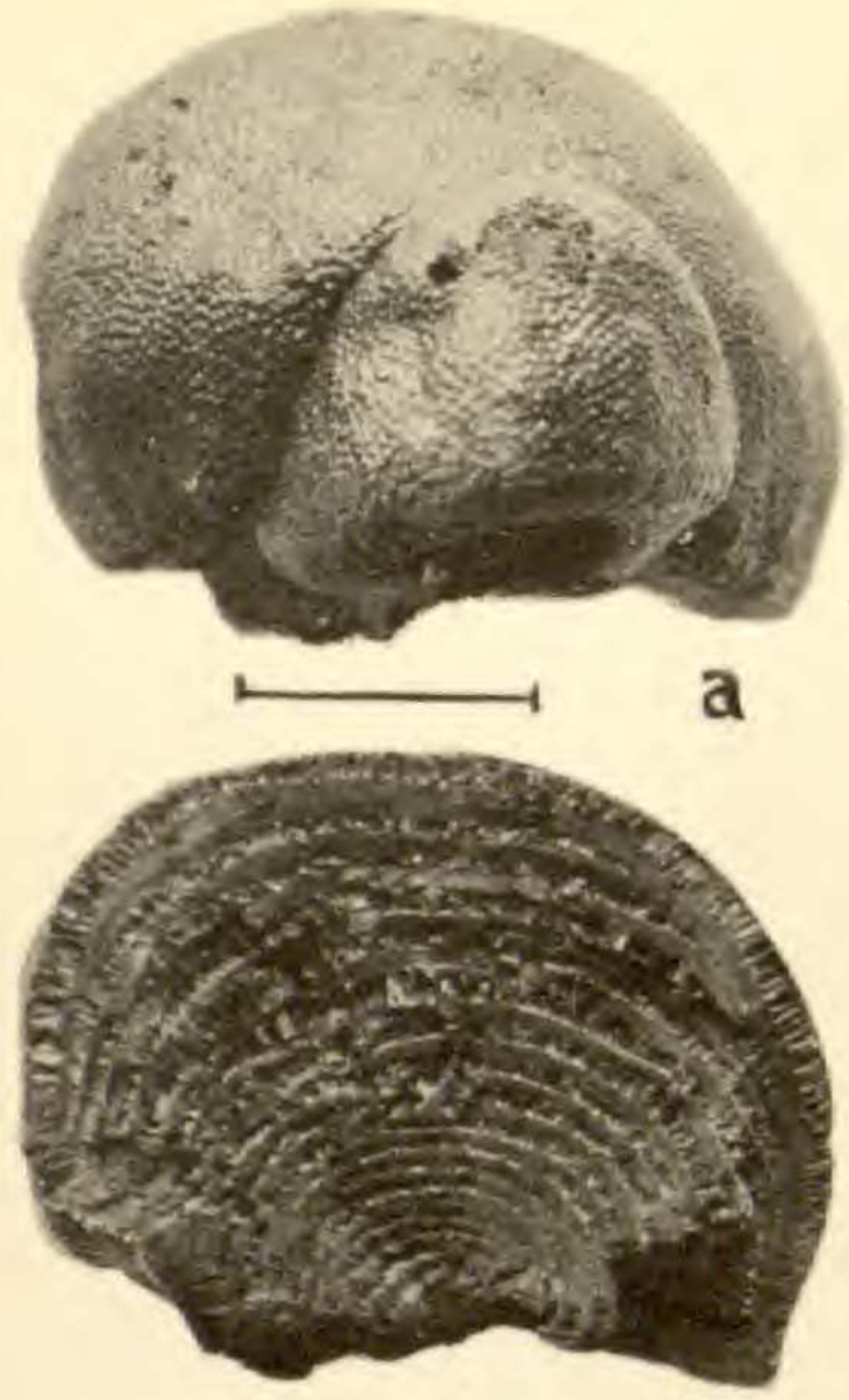
Fig. 5. *Daldinia Eschscholzii*, from the Philippine Islands, collected by M. Ramos at Antipalo, Luzon. Distributed from the Herbarium of the Bureau of Science at Manila, as *Daldinia concentrica* var. *microspora* (Starb.) Theiss.

Fig. 6. *Daldinia Eschscholzii* (Forestry Bureau no. 19201 of the Bureau of Science at Manila). This species with the convoluted stroma was distributed as *Daldinia concentrica*.

Fig. 7. *Daldinia concentrica* (Norfolk, England, *C. B. Plowright, 69* (St)).

Fig. 8. *Daldinia Eschscholzii*, from Mozambique.

Fig. 9. *Daldinia concentrica*, from Germany.



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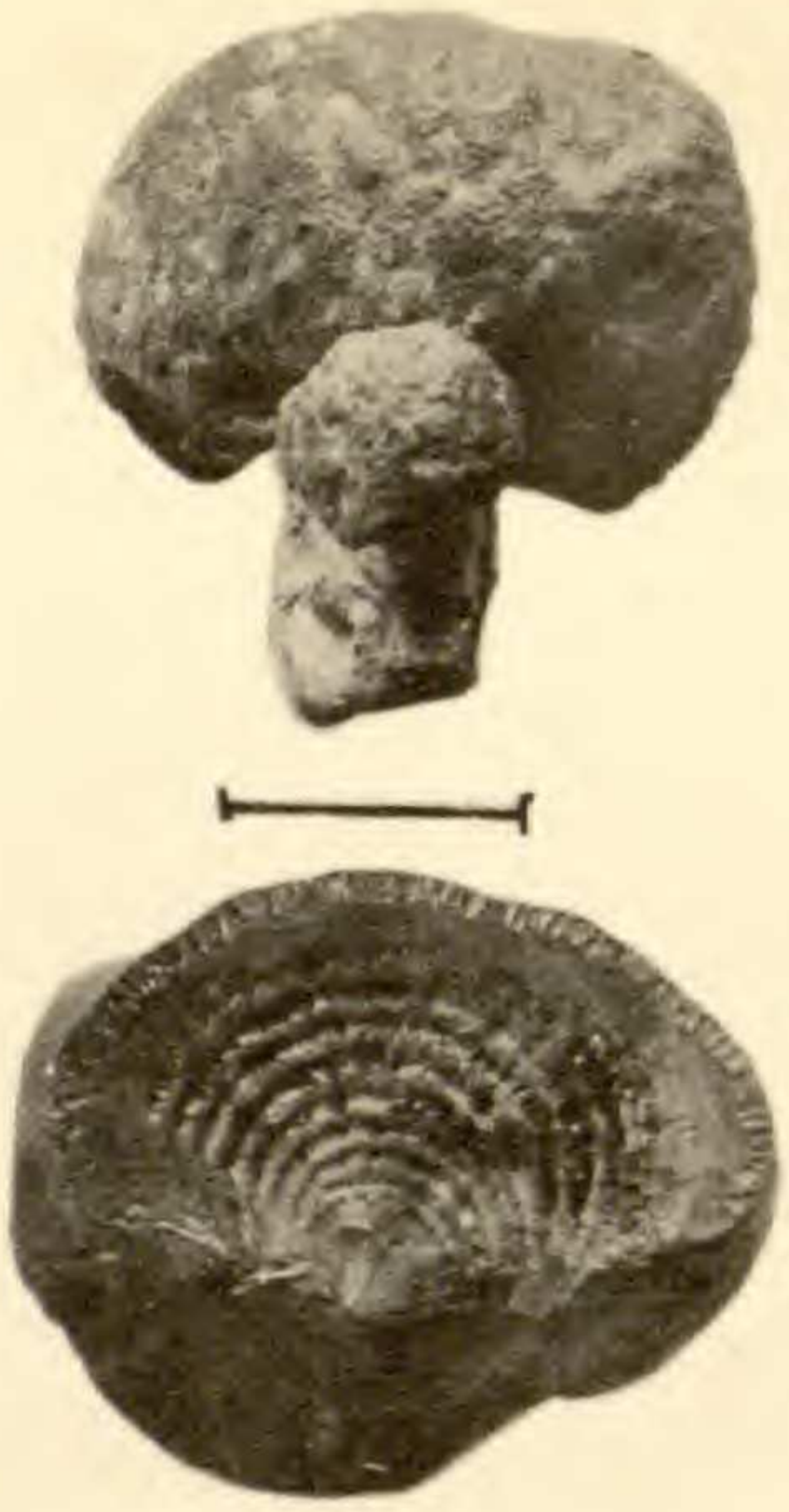

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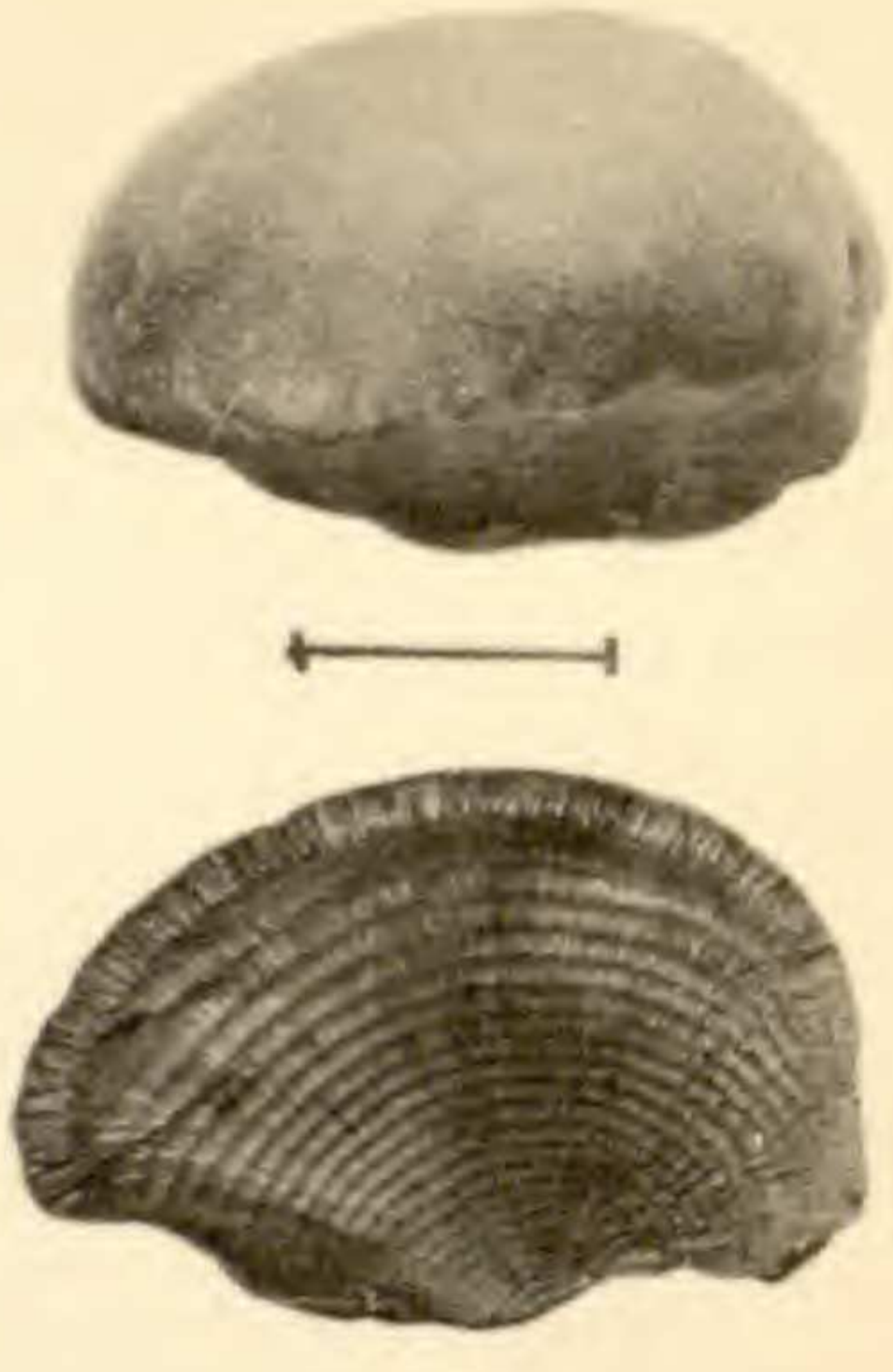

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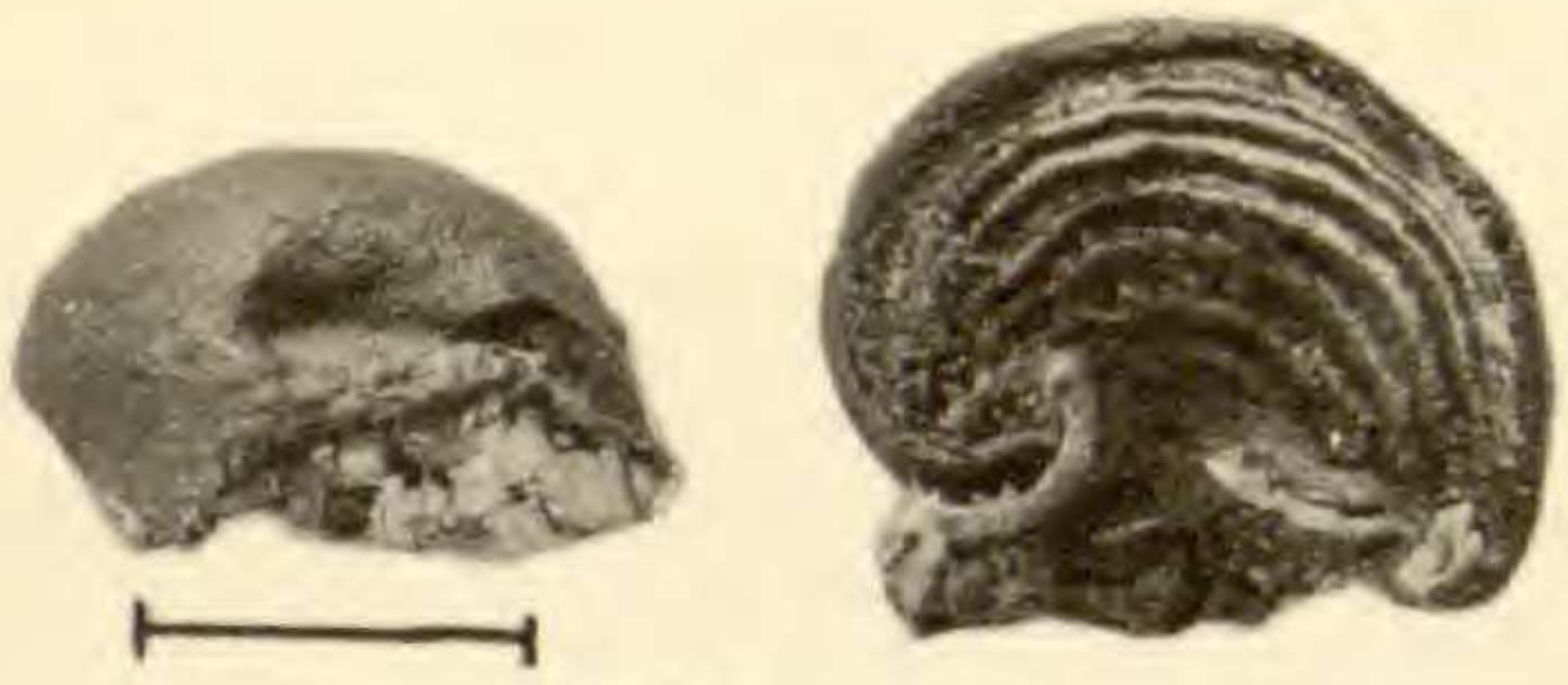

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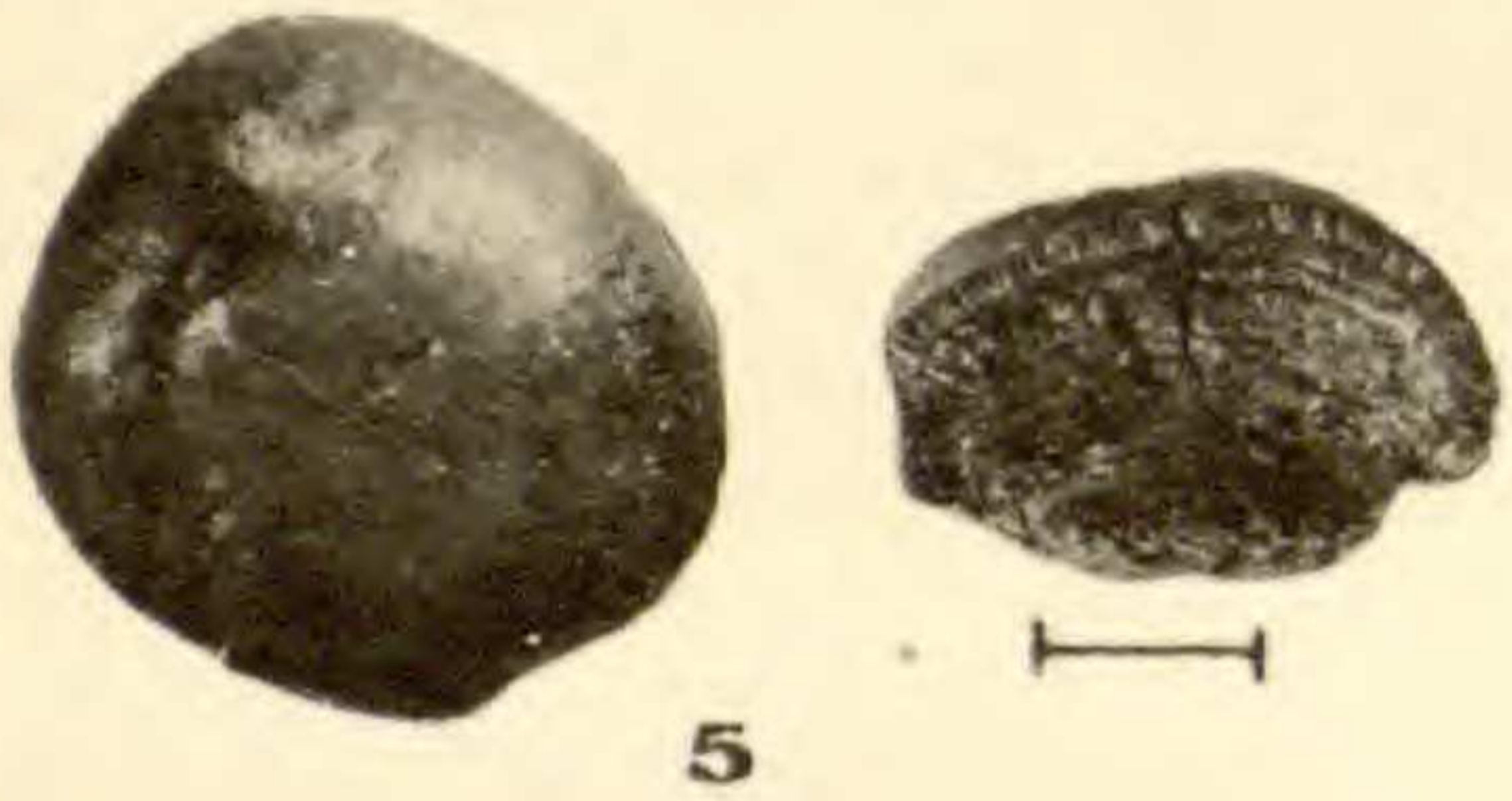

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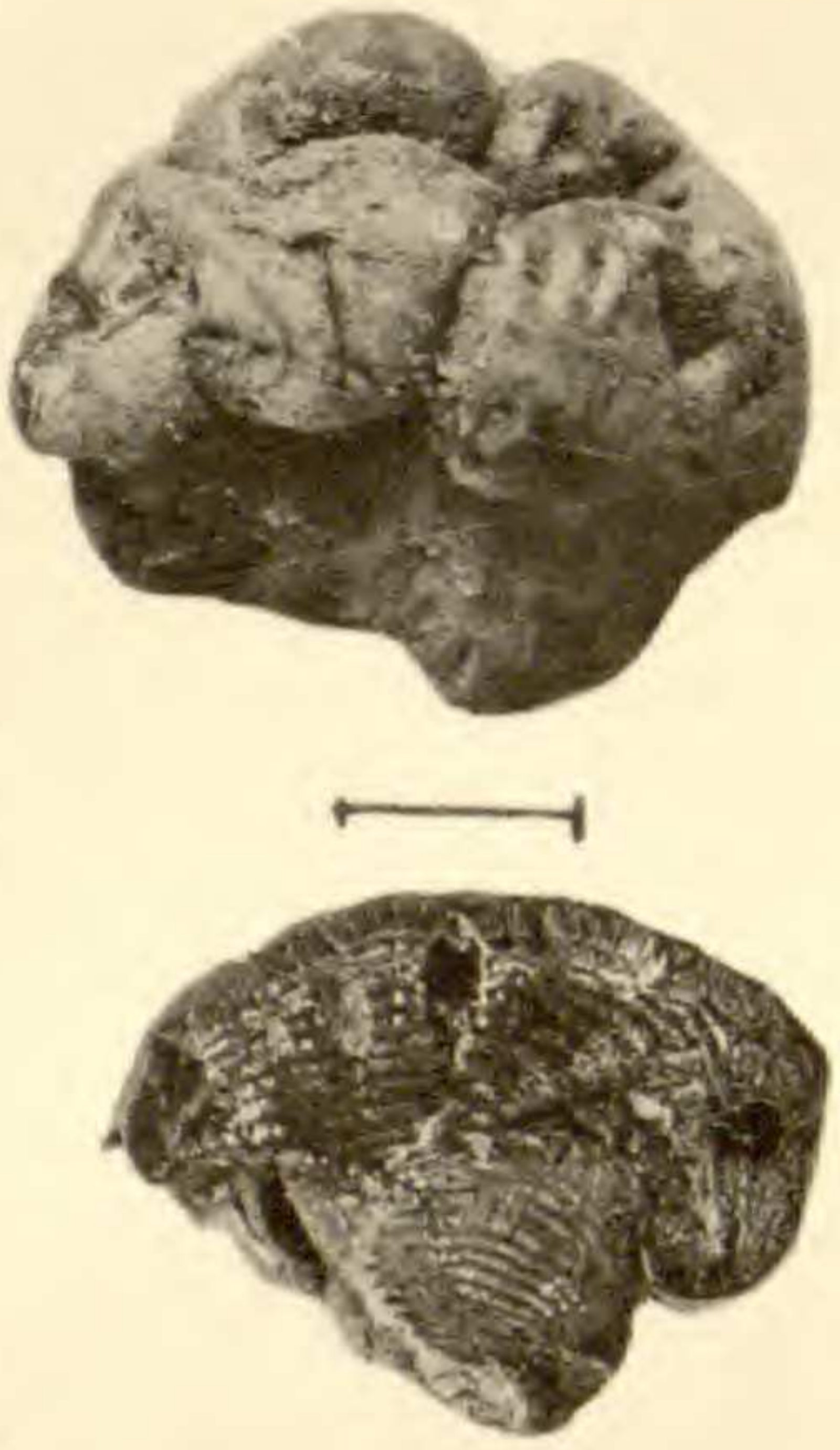

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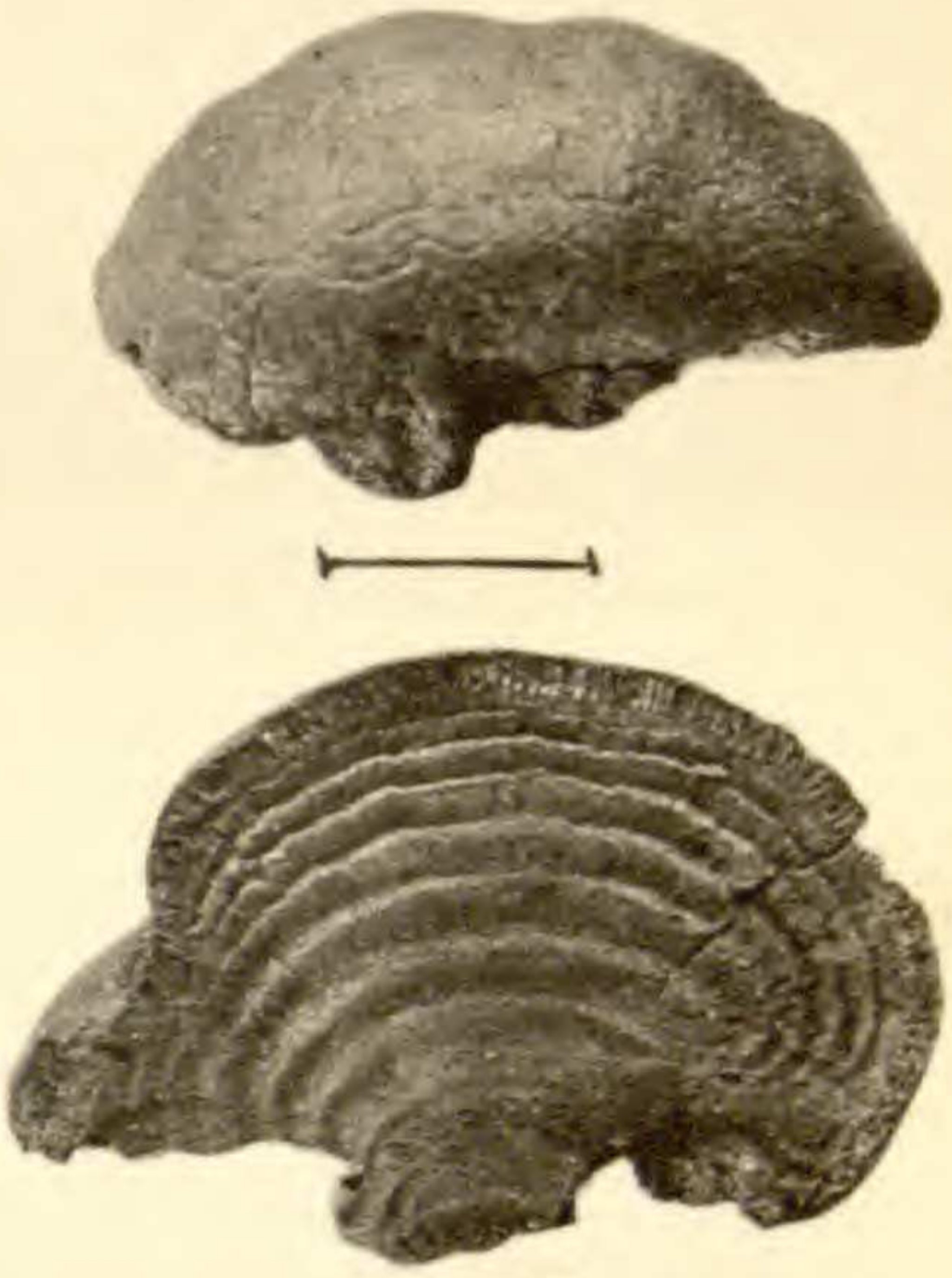

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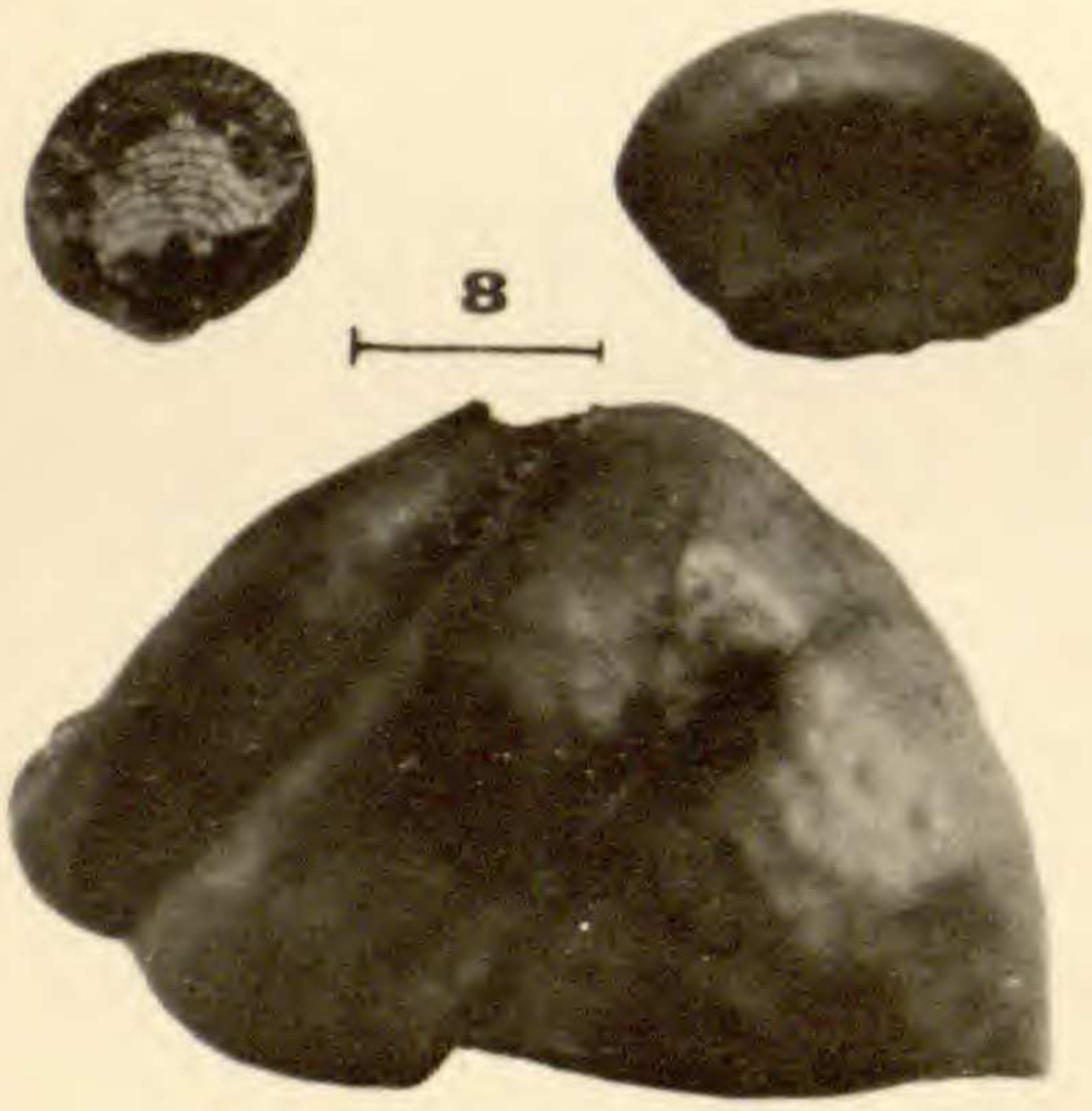

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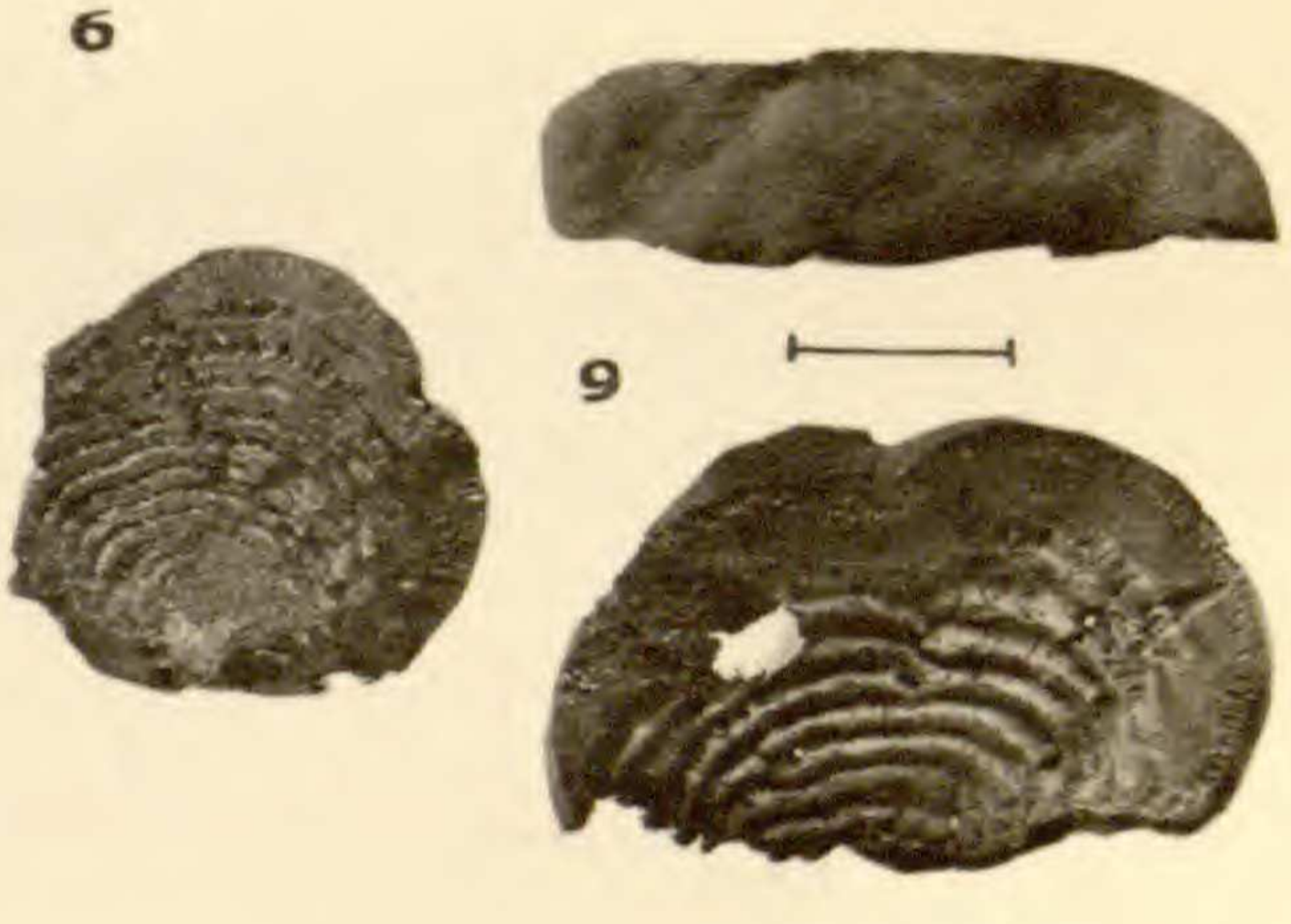


9

CHILD—THE GENUS DALDINIA

Explanation of Plate

PLATE 30

The scale accompanying each figure equals 1 centimeter.

Fig. 1. *Daldinia concentrica.* The type of *D. durissima* (Schw.) Sacc. The ostioles of the somewhat weathered material are rather prominent for this species.

Fig. 2. *Daldinia vernicosa,* from Canton, Massachusetts.

Fig. 3. *Daldinia simulans,* from Evanston, Illinois.

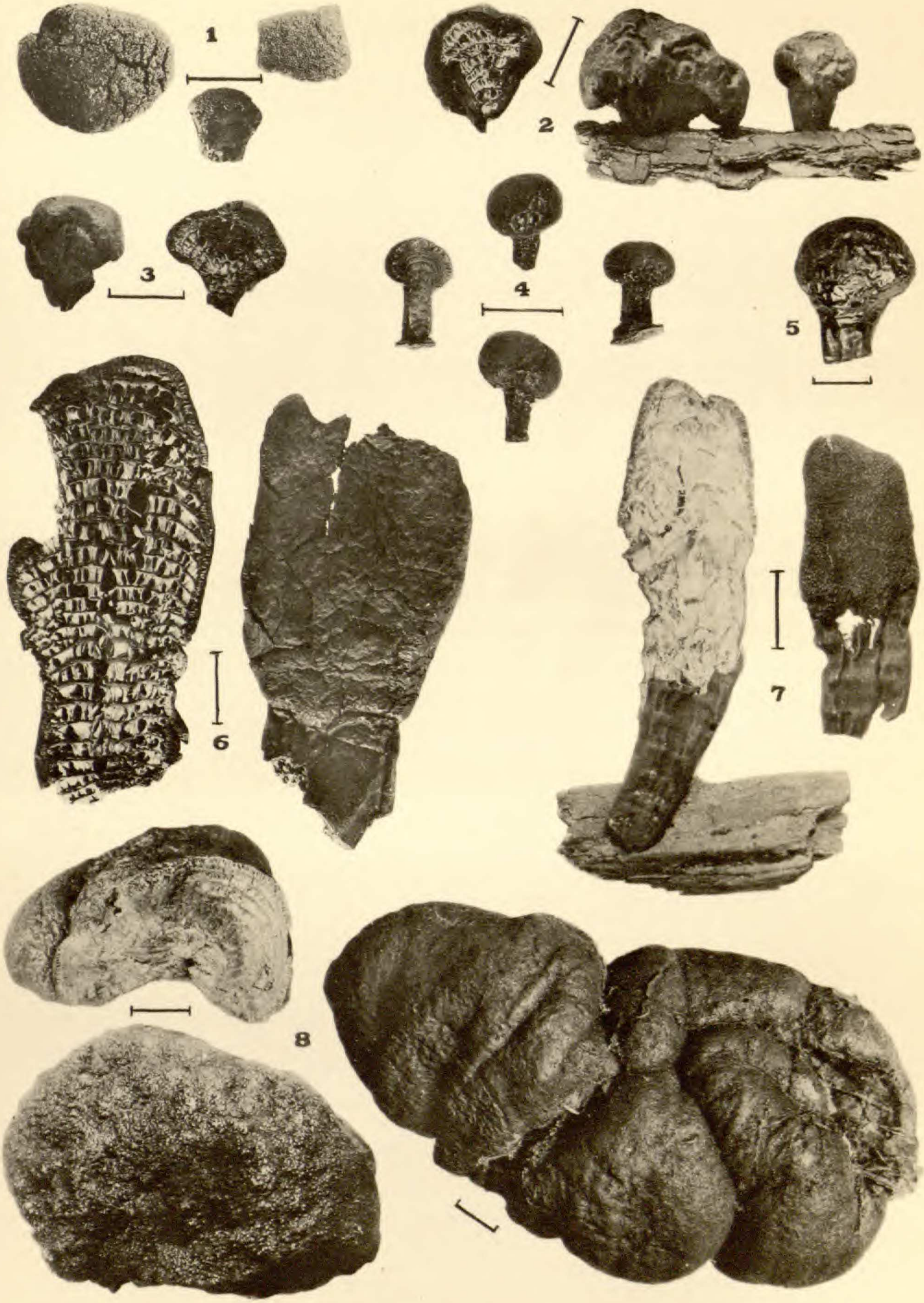
Fig. 4. *Daldinia loculata,* from Preston, Ohio. Note the definite, cylindrical stipe.

Fig. 5. *Daldinia vernicosa.* Type specimen in the Schweinitz Herbarium.

Fig. 6. *Daldinia clavata,* from Jujuy, Argentina, the type of *D. argentinensis* Speg.

Fig. 7. *Daldinia cuprea,* from Paraguay. Type material. The prominent ostioles and the less conspicuously zonate and loculate entostroma aid in separating this from the preceding species.

Fig. 8. *Daldinia grande.* Type material. Note the variation in the size and prominence of the ostioles.



CHILD—THE GENUS DALDINIA

EXPLANATION OF PLATE

PLATE 31

The drawings of the perithecia were all made with the aid of the camera lucida and are all drawn to the same magnification.

Fig. 1. *Daldinia Eschscholzii,* drawn from a thick section and hence does not show the thickness of the ectostroma.

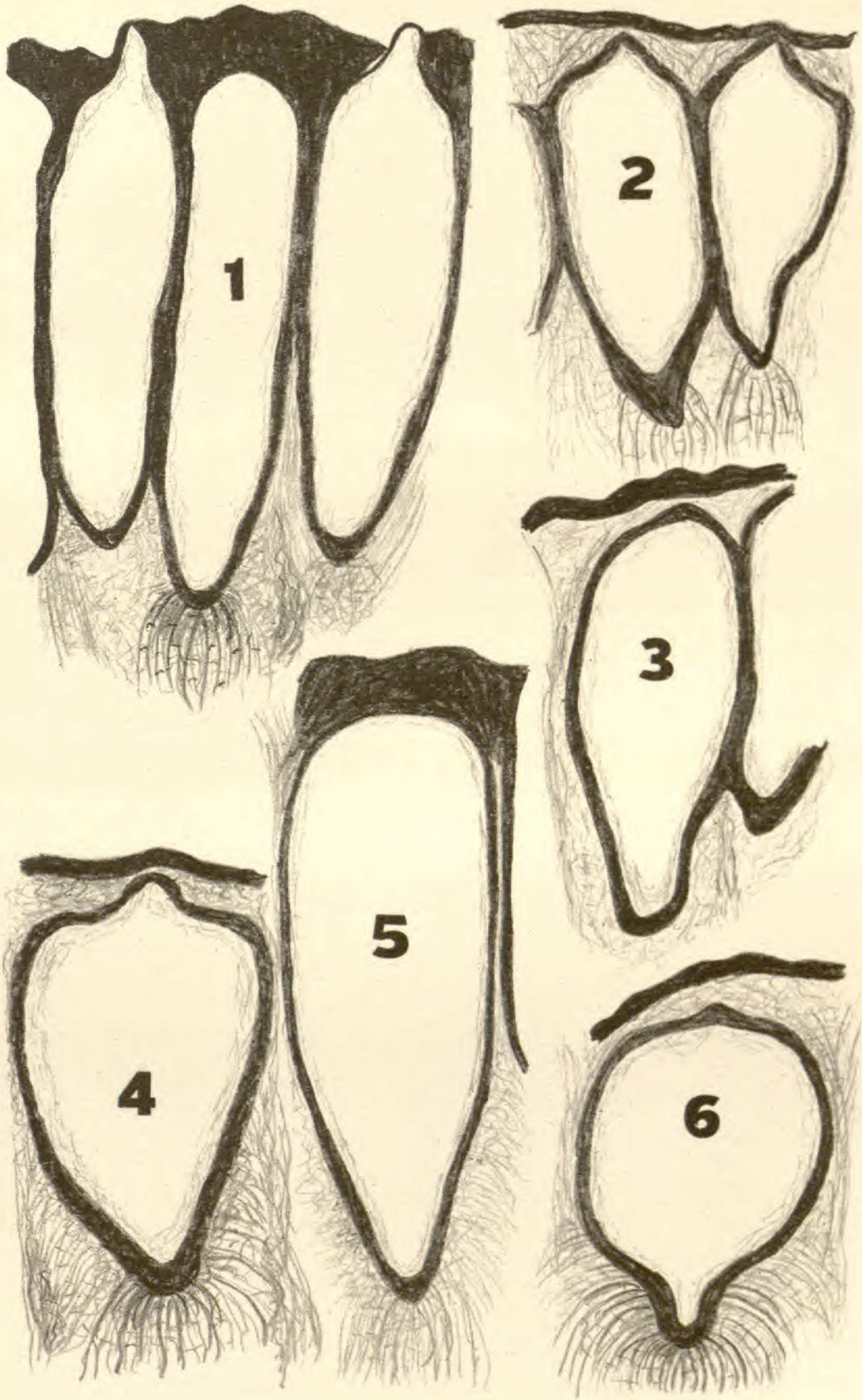
Fig. 2. *Daldinia caldariorum,* from type material.

Fig. 3. *Daldinia albozonata,* from type material.

Fig. 4. *Daldinia cuprea,* from specimen collected in Argentina (?) (St).

Fig. 5. *Daldinia Bakerii,* from type material.

Fig. 6. *Daldinia Gollani,* from type material.



CHILD—THE GENUS DALDINIA

EXPLANATION OF PLATE

PLATE 32

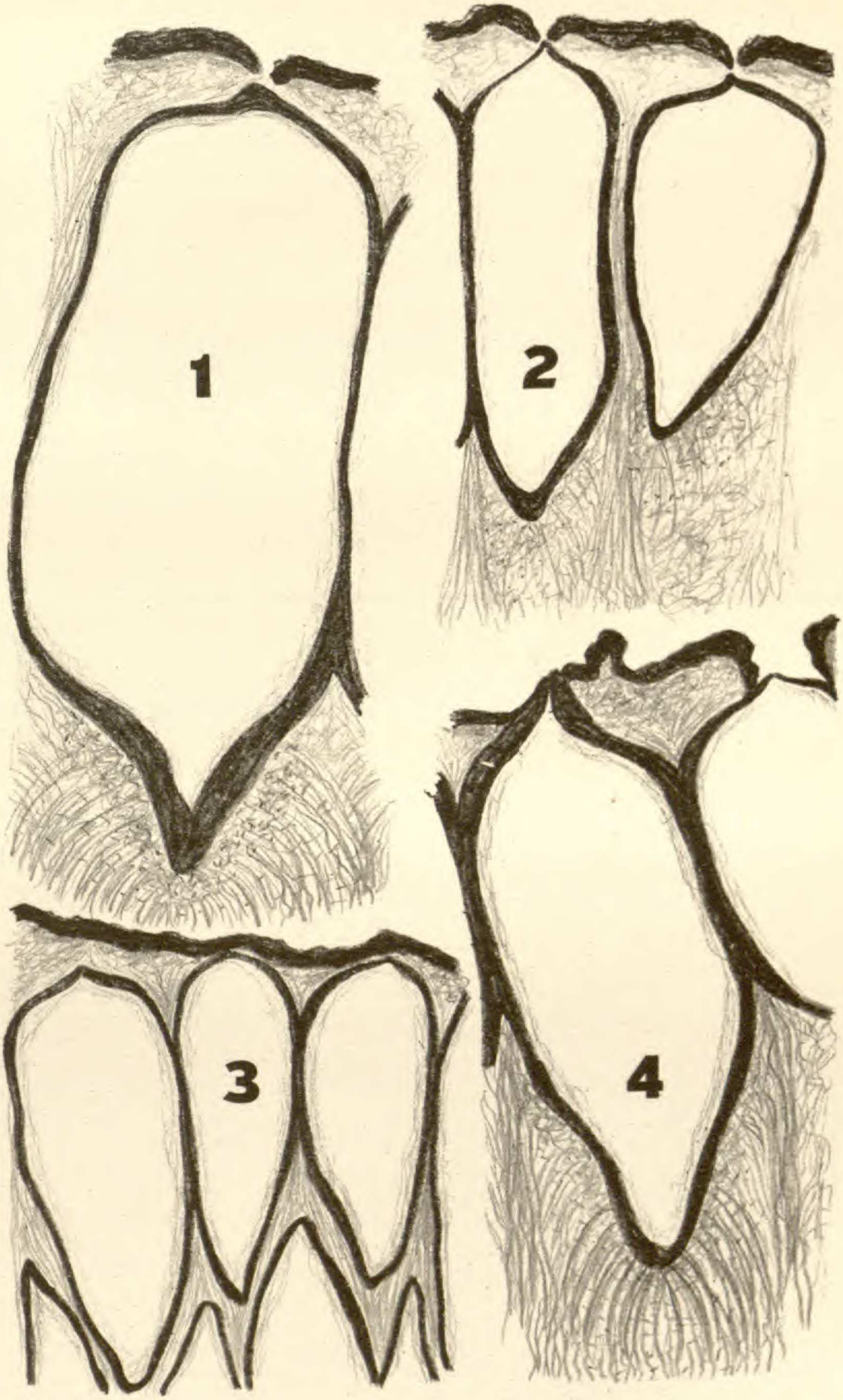
The drawings of the perithecia were all made with the aid of the camera lucida and are drawn to the same magnification.

Fig. 1. *Daldinia loculata,* from material collected in Iowa (Ia 1352).

Fig. 2. *Daldinia loculata,* from material collected in Ohio (Ia). Note the difference within the species of perithecial size and shape.

Fig. 3. *Daldinia grande,* from type material. In this species the perithecia are usually polystichous.

Fig. 4. *Daldinia occidentale,* from material collected by A. S. Rhoads, at Metaline Falls, Washington (PDS). Note that the ostiole penetrates through the ectostroma.



CHILD—THE GENUS DALDINIA

EXPLANATION OF PLATE

PLATE 33

The drawings of the perithecia were all made by the aid of a camera lucida and are all drawn to the same magnification.

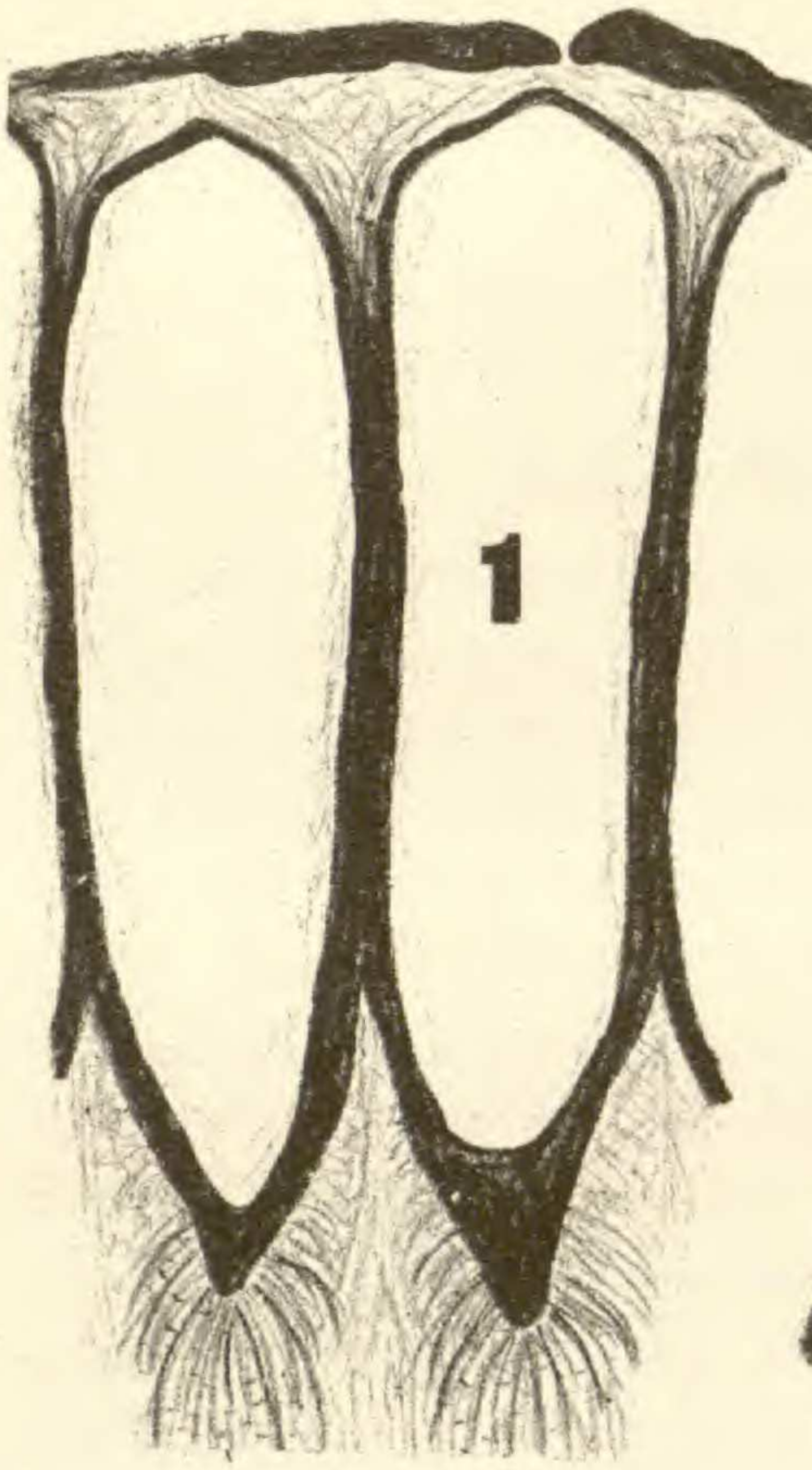
Fig. 1. *Daldinia concentrica*, from material collected in Missouri by Marion Child.

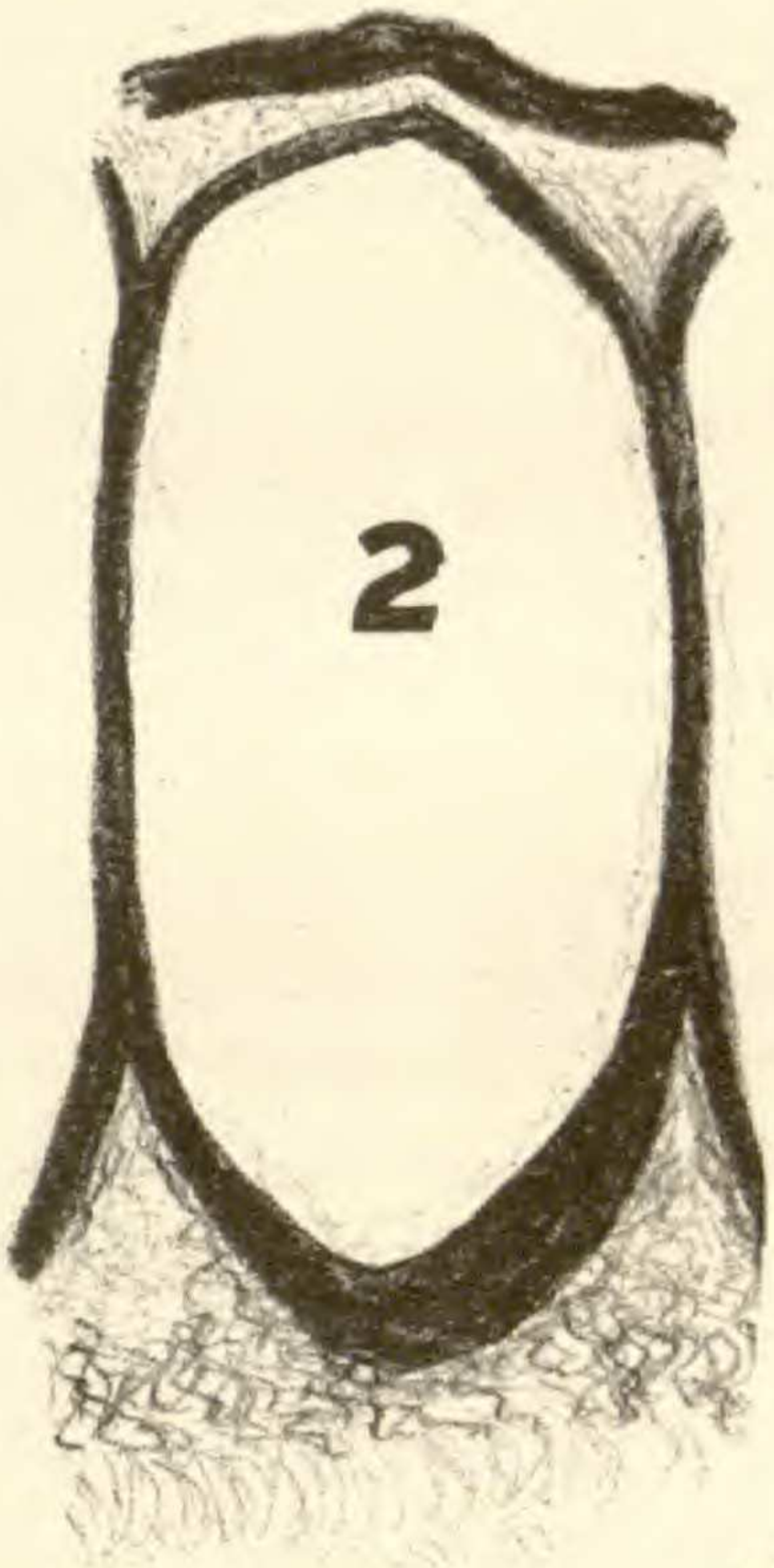
Fig. 2. *Daldinia vernicosa*, from material collected at Fort Riley, Kansas, by Brenckle.

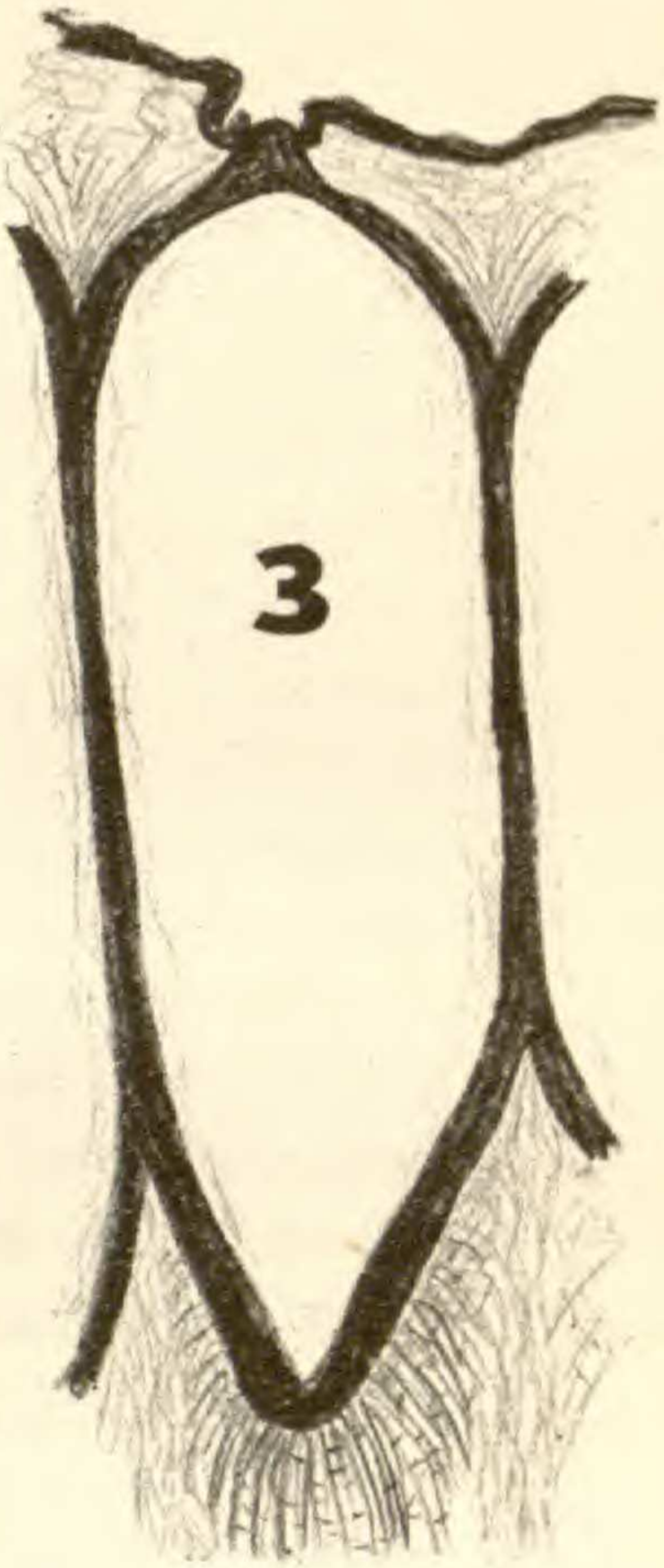
Fig. 3. *Daldinia Eschscholzii*, from material collected in Argentina.

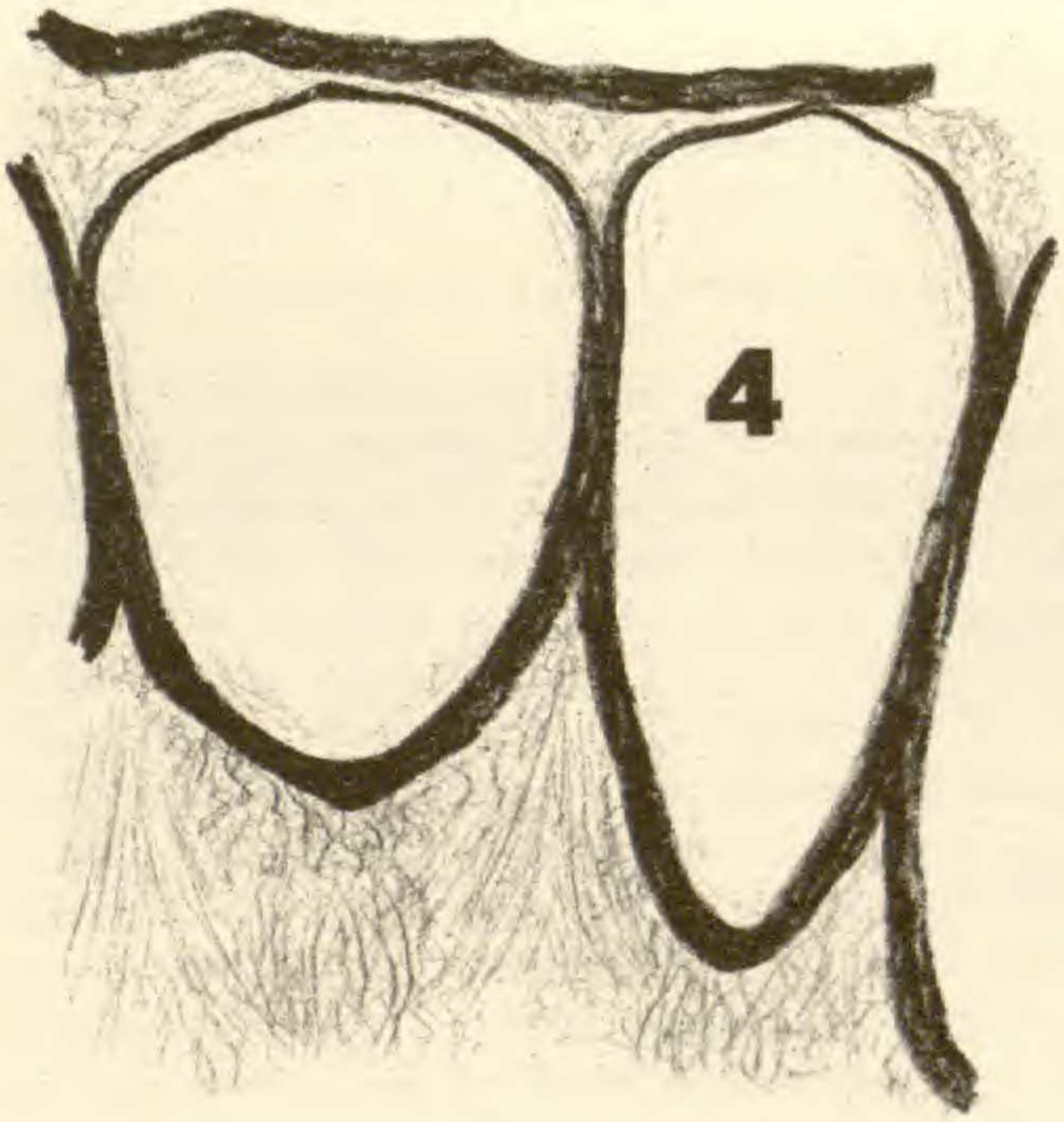
Fig. 4. *Daldinia simulans*, from type material.

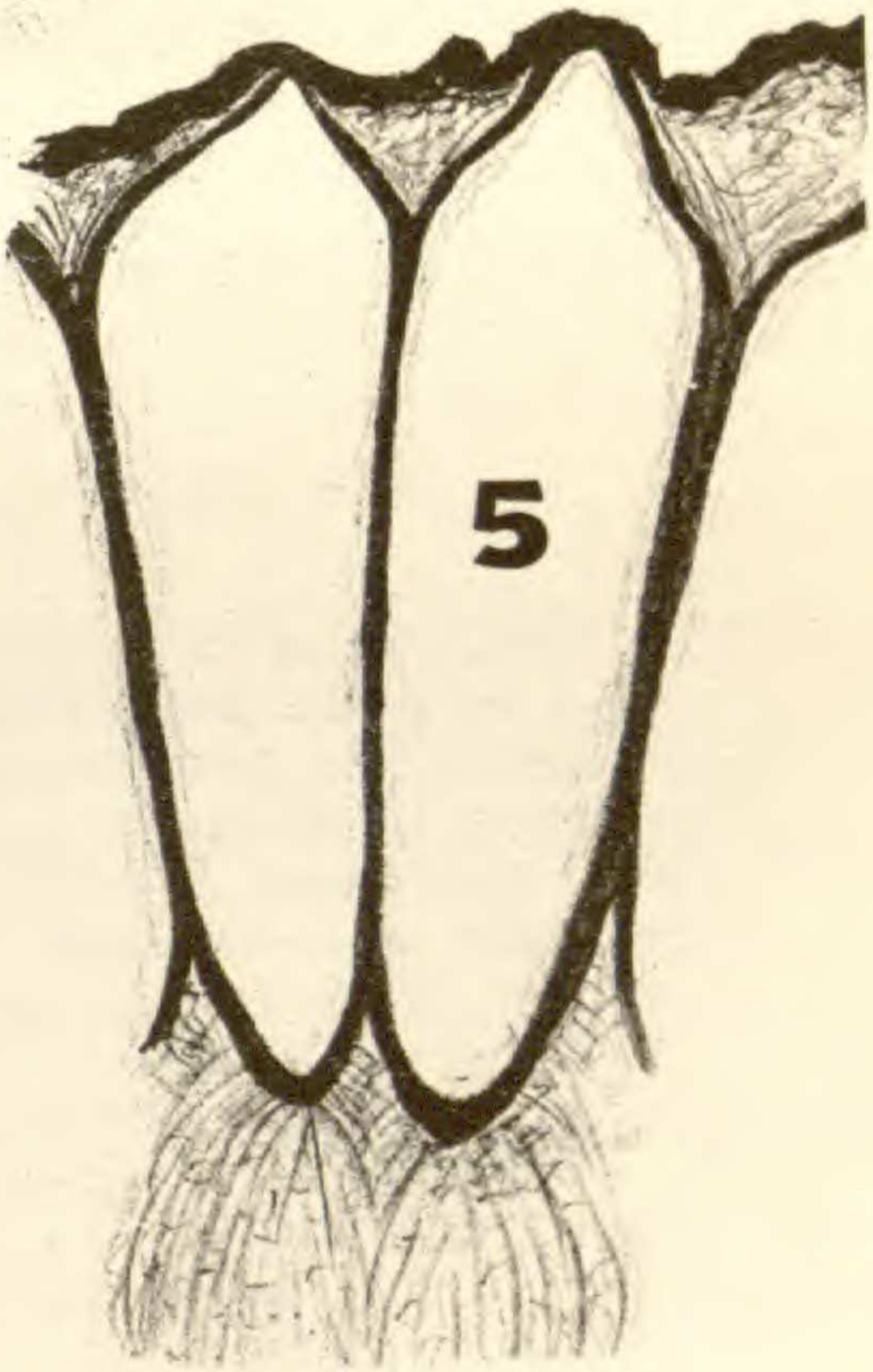
Fig. 5. *Daldinia clavata*, from material collected at Matto Grosso, Brazil, by G. O. Malme (St).











CHILD—THE GENUS DALDINIA